USER SERVICE REQUIREMENTS :

THIRD - PARTY MAINTENANCE

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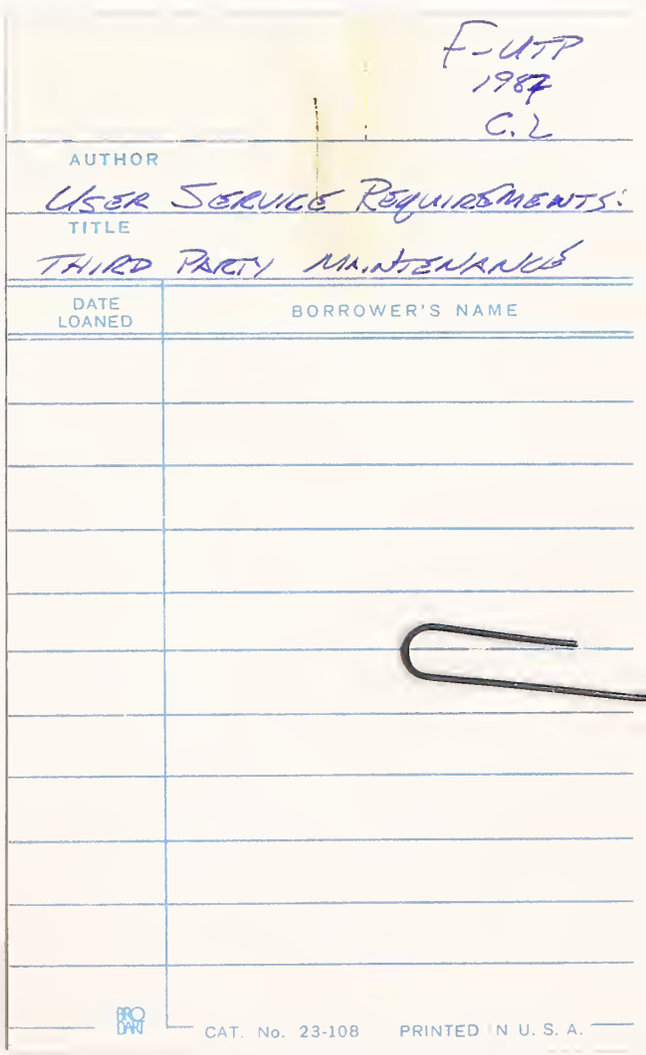
USER SERVICE REQUIREMENTS:

THIRD-PARTY MAINTENANCE



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User Service Requirements: Third-Party Maintenance

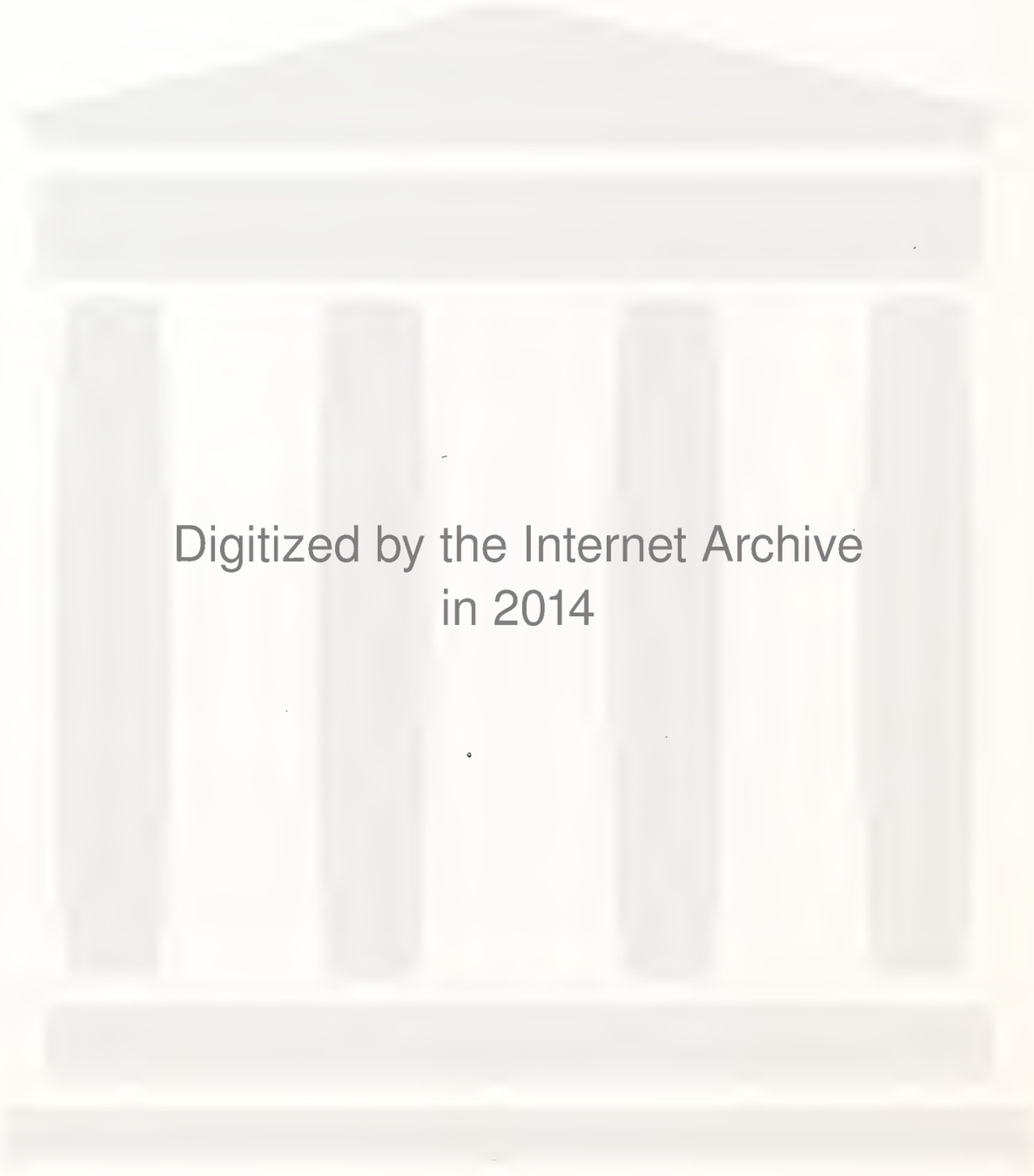
Abstract

This report examines the service and support requirements of third-party maintenance users, as reported directly by those users. A sample of two hundred firms employing third-party support is the basis of this analysis, with individual respondents reporting both objective performance measures and subjective ratings and perceptions of TPM versus manufacturer-based support.

Individual factors affecting choice of TPM over manufacturer service are discussed along with TPM-user propensity to expand third-party involvement, and actual support performance of TPM and manufacturer are compared within the body of the report. Traditional response and repair measures are presented, along with user ratings of specific support components. Support performance in all categories is compared directly to user requirements, providing readers with a realistic perception of current support-market demands.

These analyses are presented first for the third-party market as a whole, then broken out into the individual equipment categories covered by INPUT, including the large systems, small systems, micro, and peripherals sectors. The report concludes with an overview of current trends recognized within the TPM market, supported by a number of specific strategic recommendations for market players.

This report consists of 66 pages, including 41 exhibits. Two appendices contain the questionnaire used in preparation of the report and a list of associated service definitions.



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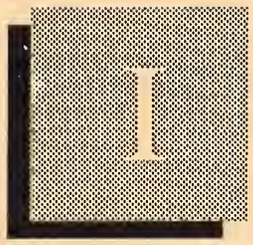
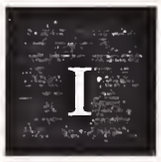


Introduction



Introduction

A

Scope

A component of INPUT's 1987 Third-Party Maintenance module, this report addresses the TPM marketplace from the viewpoint of the third-party support user. The objective of the report is to identify and analyze the needs of TPM users within various product-related factions of the market, measured in a number of specific support areas. This examination of the perceptions held by current users of TPM support provides insight into a variety of strategic factors as they relate to both third-party and manufacturer interests.

As the competition for maintenance revenues stiffens, both TPMs and equipment vendors are concentrating efforts on holding (and increasing) their share of the support dollar. *User Service Requirements: Third-Party Maintenance* examines the factors influencing users in the choice of TPM over manufacturer-supplied support and how these factors have changed over time. The correct identification of these selection criteria provides a strong base for competitive planning within the changing maintenance market.

Actual support performance, in terms of both traditional objective measures (such as mean times to repair and respond) and more subjective satisfaction ratings, are compared between users' current third-party sources and previous manufacturer-supplied service. Hardware and software support are then examined in more detail, as performance in specific service areas is contrasted with user-defined demands. When possible, these TPM support ratings are compared with those reported by users of manufacturer-supplied service in the same product arena.

User satisfaction within each of these support areas is also presented and, again, compared directly with the satisfaction reported by users of manufacturer-supplied service when available. Service areas providing differentiation between TPM and systems vendor service are readily identified, providing readers with a clear perspective on the various players' strongholds within the maintenance market as well as weaknesses to be corrected.

Finally, an overview of current trends surfacing within the third-party market is provided, and the shape of future user demands is discussed.

These factors are then strategically applied in terms of future service directions, and alternative and expanded service option recommendations are made.

B

Demographics

In preparation of this report, 200 firms utilizing third-party sources of maintenance were contacted, and a variety of support issues were discussed with key DP and operations personnel at each site. This information was then tabulated and analyzed first in terms of the TPM market as a whole, and then subdivided into systems (large, small, and micro) and peripherals categories.

The sampled firms covered a wide variety of standard industry categories (as illustrated by Exhibit I-1), with higher concentrations in the distribution, manufacturing, and services industries reflective of relative TPM penetration within these business sectors.

EXHIBIT I-1

SAMPLE BY INDUSTRY SERVED

INDUSTRY CATEGORY	NUMBER OF RESPONSES
Distribution	46
Manufacturing	43
Services	41
Transportation	22
Education	14
Banking and Finance	9
State and Local Government	6
Federal Government	4
Insurance	4
Medical	4
Telecommunications	4
Utilities	3
Total	200

INPUT interviewed the appropriate data processing official at each site. As shown in Exhibit I-2, the majority of these respondents held data processing/information systems or operations management titles. Within smaller firms, high ranked administrators (VPs, owners, etc.) oversaw the outside support function.

EXHIBIT I-2

SAMPLE BY TITLE

TITLE	NUMBER OF RESPONDENTS
CEO, Vice President, Administrator	55
MIS Director, DP Manager, Systems Manager	111
Operations, Service Coordinator/Manager	22
Programmer, Systems Analyst	7
Other	5
Total	200

Within the sample, close to 100 third-party vendors were represented, including major competitors, franchised shops, and local TPM operations across the U.S. Exhibit I-3 lists specific vendors and typical products serviced at the sampled sites.

EXHIBIT I-3

SAMPLE BY TPM VENDOR USED

TPM VENDOR	NUMBER OF MENTIONS	TYPICAL PRODUCT SERVICED
Sorbus	36	IBM 43XX, System 34, System 36, PC and Peripherals; Basic Four Systems
Datacomp	11	IBM System 34, System 36, System 38
CDC	10	IBM 43XX, Peripherals; DEC PDP 11/XX
TRW	9	IBM 43XX, PC and Peripherals; DEC VAX 11/7XX; Altos Systems
GE/RCA	8	IBM 3090, System 34; DEC VAX 11/7XX; Data General Nova; Texas Instruments PC
DP Enterprises	7	IBM System 34, System 36, 43XX, PC
Honeywell	5	DEC PDP 11/7X; IBM 43XX; Televideo Terminals
Intelogic Trace	5	Datapoint 6000, IBM PC
Eaton	3	DEC VAX 11/7XX
Datagate	2	HP 3000, Peripherals
Decision Data	2	IBM System 36; Wang OIS
NCR	2	IBM PC, Peripherals
Systems Industries	2	DEC VAX 11/780, Wyse Terminals
Other	98	IBM, DEC, Burroughs, DG, Basic Four
Total	200	

Executive Overview

II

Executive Overview

This section of *User Service Requirements: Third-Party Maintenance* is provided to present the major findings of the report in a convenient, overview format. Information is presented in clear, concise exhibits to facilitate its use in in-house presentations. Each exhibit is designed to illustrate a key point revealed by this year's research; the accompanying text outlines its significance in the third-party marketplace.

TPM market players now find themselves in an environment differing drastically from the hospitable marketplace third-party maintenance once represented. Weaker contenders are being rapidly driven out of the market, or are absorbed into stronger support operations, creating an even more formidable third-party force in the competitive support market. Equipment vendors are also shoring up to defend their eroding service revenues, under pressure from both external TPM competition and internally, to cover for declining sales margins.

At the same time, users are expecting top performance from both their system and their support vendor, as the service market becomes a "buyer's marketplace." As a result, maintenance vendors are facing increasing pressures from all sides. This report provides an analysis of the perceptions and requirements of these third-party users, in terms of both third-party and manufacturer-supplied service performance. Market demands, as defined by the users themselves, are clearly outlined, providing support vendors with a valuable information for strategic defense.

A

Price Considerations Resurfacing in "Buyer's Market"

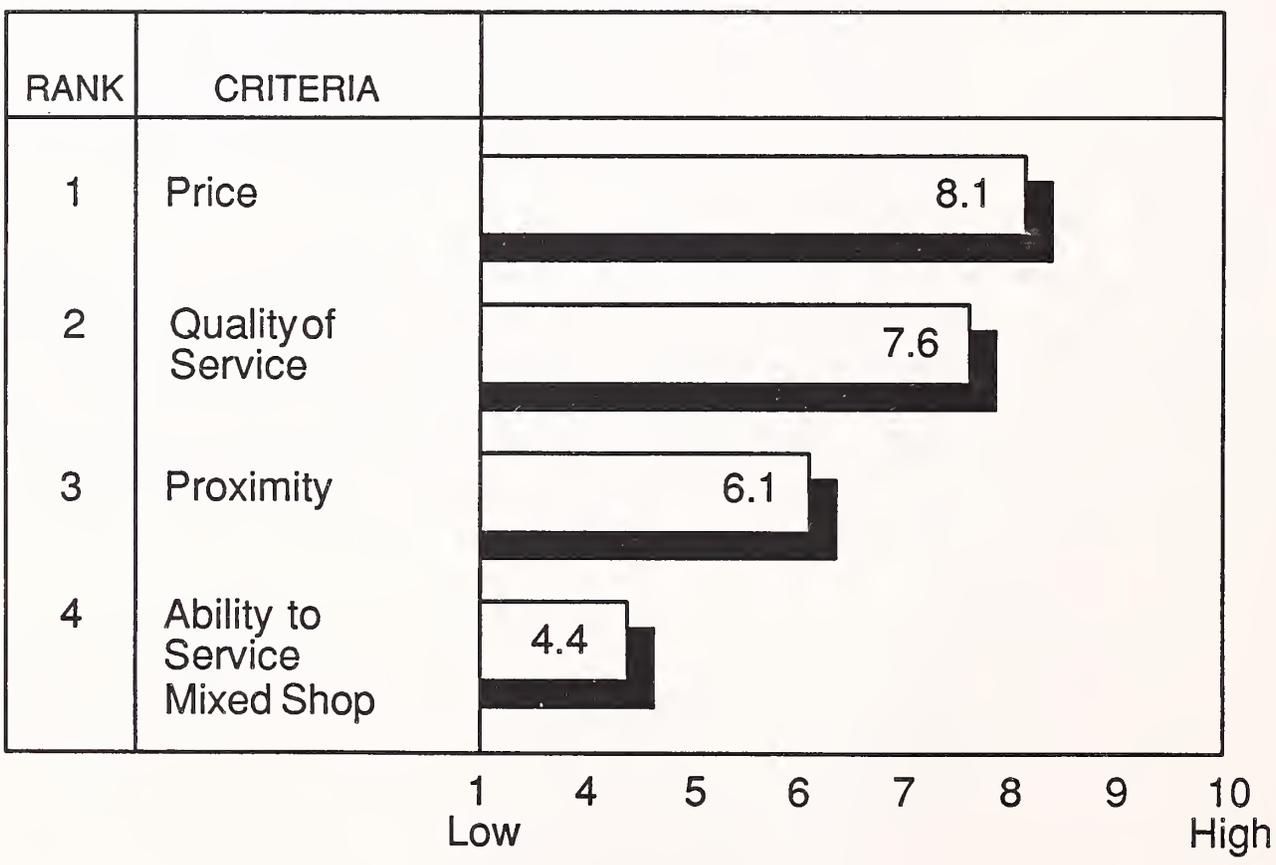
As third-party maintenance broke into the competitive arena, a large part of its inital draw was in the savings TPM represented over much of the manufacturer-supplied support then available to users. As the third-party market matured and TPM was established as a quality source of maintenance support, price slowly decreased in importance in the user's eye, and competition become more centered around vendor reputation. By 1985, basic performance factors such as response times had become essentially as important to the user as price.

1986 data showed the importance of support pricing edging its way back to the number one spot, with users rating its weight in the purchase decision at 7.2 points, followed very closely by quality reputation and performance concerns (both at 7.0). Market shakeout of TPMs not equipped to make the grade had, by this time, served to better assure the quality reputation of the players remaining.

Today's marketplace, defined by the fierce competition between these remaining players, again promotes price ahead of other user concerns, with quality and performance factors practically enforced by market conditions. At the same time, user concern over price is aggravated by the increasing reliability of hardware products under service; users expect to see support costs decreasing along with failure rates. All of these factors have driven price concerns to a new high among TPM decision criteria, now rated at 8.1 points (as shown in Exhibit II-1).

EXHIBIT II-1

TPM SELECTION CRITERIA



The weight of other concerns, such as vendor proximity to user site and the ability to support a mixed-vendor shop, have decreased greatly in the purchase decision. As third-parties increase their use of manufacturer-supplied remote technologies and increasing numbers of manufacturers introduce their own brand of cross-vendor service, user perception of differentiation between TPM and manufacturer on these terms is blurred.

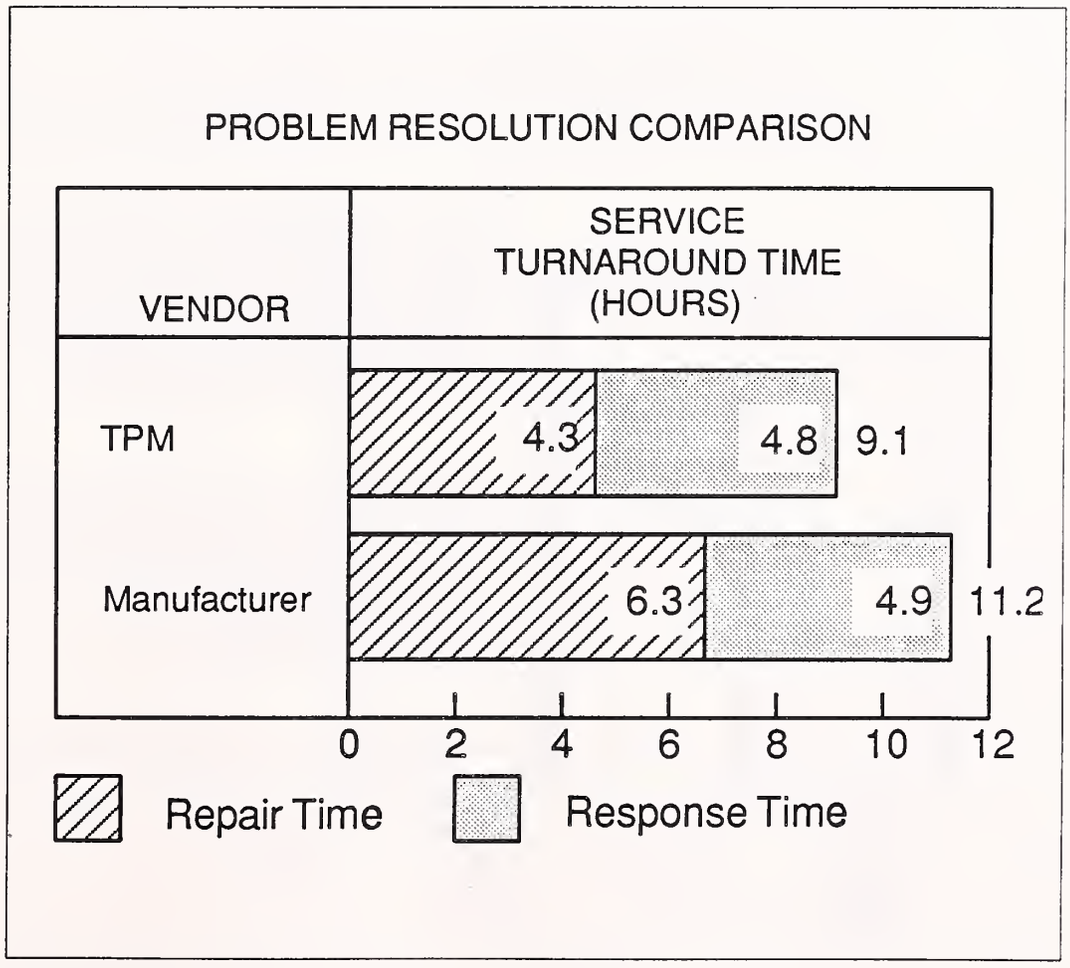
B

TPM Support Providing Edge Over Manufacturer Performance

Driven by the fierce competitive climate surviving TPMs have weathered, third-party vendor performance is now surpassing manufacturer-supplied service in all product sectors. TPM users contacted in 1986 had reported problem resolution times which closely approached the level of manufacturer-based service on large and small system products, but TPMs then lagged well behind in the lower-end categories.

Among this year's sample, users reported improvements in overall TPM problem resolution performance amounting to a nearly two-hour edge over manufacturer-supplied support (as shown in Exhibit II-2). Significant gains were made over equipment vendor service in terms of reponse times; users reported response to trouble calls averaging two hours less than that provided by manufacturer operations. The improvements in turnaround perfomance were especially notable within the small and micro systems TPM performance.

EXHIBIT II-2



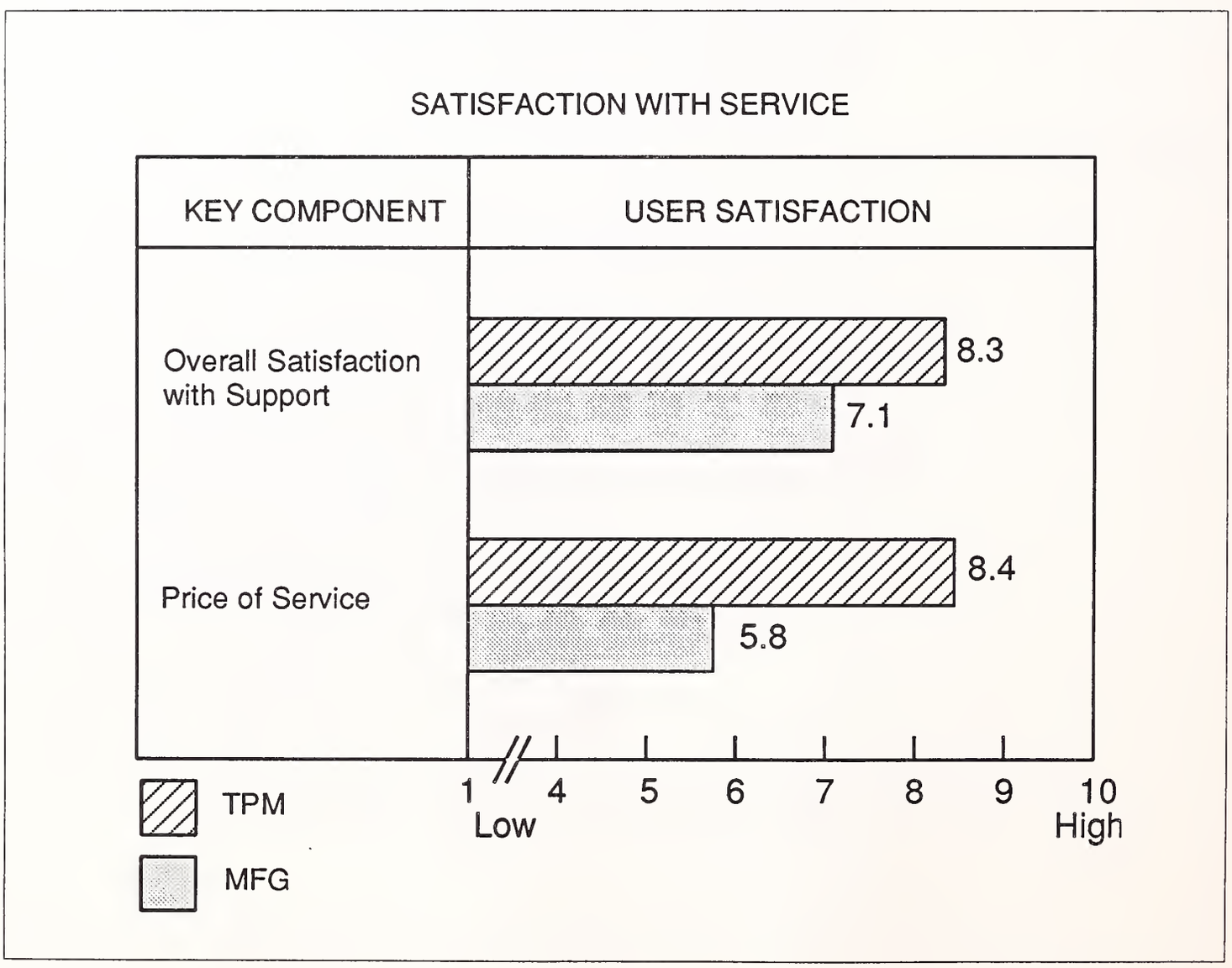
Manufacturer service operations are up against tough competition from their third-party counterparts in an area of performance which is highly valued by users. Users within all product sectors voiced great concern over response and repair turnaround when prioritizing pressing service issues; problem resolution was the aspect of support most often mentioned by TPM and manufacturer-support users alike when discussing the services they most desire from their vendor. Today's third-party maintenance organizations are effectively targeting user (and potential user) demands and tailoring performance to meet them.

C

Satisfaction with Third-Party Support High

TPM vendors, working toward these user-defined goals, are currently enjoying users' favor both in terms of overall satisfaction with the quality of service as well as with the price of support. Exhibit II-3 illustrates this TPM lead in these two key components of support.

EXHIBIT II-3



As revealed in Exhibit II-1, user concern over the price of service has reached a new high as quality and performance factors equalize in the face of stiff service competition. Users reported satisfaction with third-party pricing at a level of 8.3, surpassing ratings earned by manufacturer organizations by nearly three points.

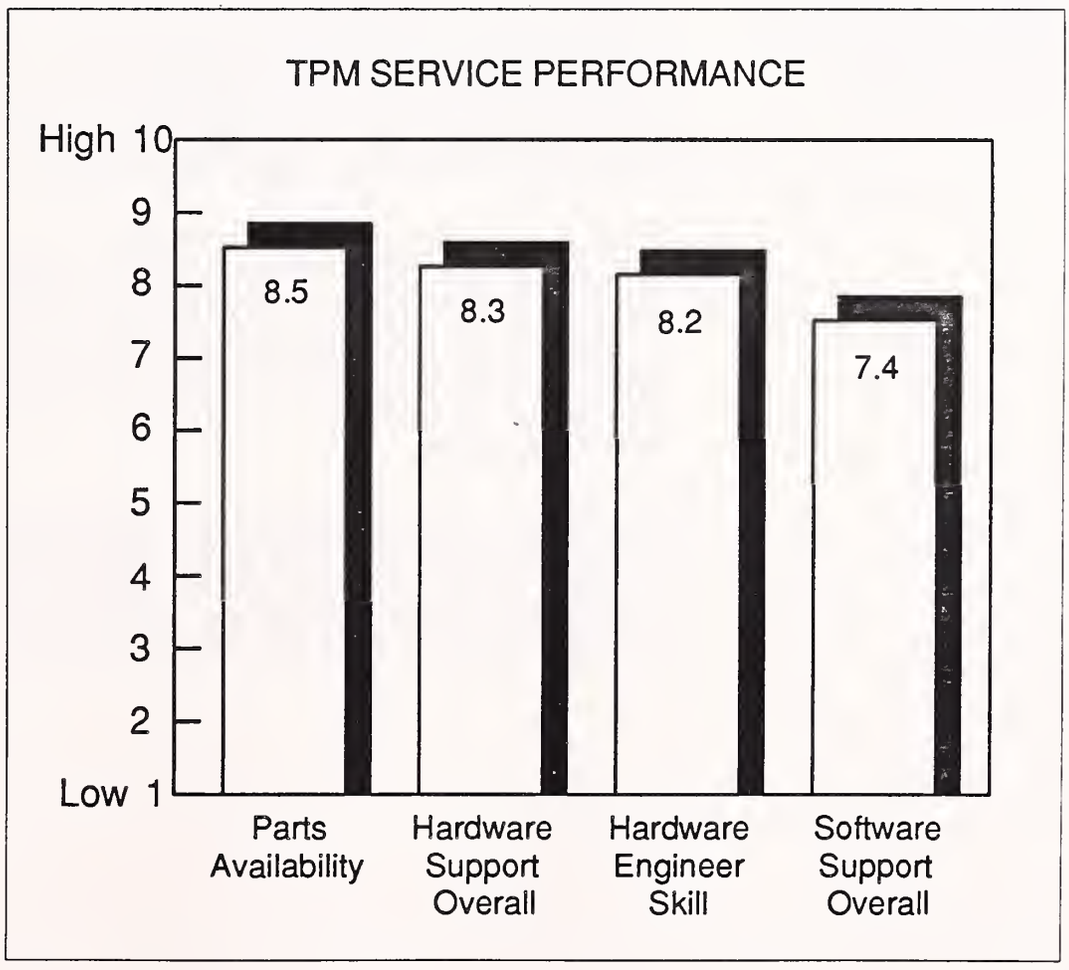
In terms of the services provided for this lower price, users still favor the support supplied by third-party vendors over that of the equipment vendor. TPMs surpassed manufacturer ratings by an average of over one point, and users are reporting greater satisfaction with the level of service currently being offered by third-party sources at a lower price. Manufacturers will have to drastically improve user perceptions of either the performance of their service or the relative price of support in order to effectively compete with up-and-coming third-party operations.

D

TPM Hardware Performance Ratings Strong

Exhibit II-4 displays the high ratings TPM users assigned to their vendor's performance in the three top-ranked aspects of overall support: parts availability, hardware support overall, and hardware engineer skill. Ranging from an 8.2 rating of engineer skill to a high 8.5 in parts support, TPM vendors are targeting efforts within these three areas deemed most important by users; ratings among hardware service components were well above those of lower priority services.

EXHIBIT II-4



Although TPMs appear to be assigning appropriate priority to performance in these high requirement services, user demands in these areas are still surpassing vendor performance. Hardware engineer skill-requirements reaching 8.9 points - is falling furthest below user demands and contributing to the 8.3 performance rating of hardware support overall. Spare parts performance, although rating a high 8.5, also falls short of rising user expectations equalling those of overall support at 9.1 points. Users, exercising their upper hand in the current "buyer's market" situation, are placing ever increasing performance demands on support vendors.

While these user demands have been increasing, however, the profitability of hardware support has been driven down. Service vendors are faced with decreasing purchase prices and higher reliability of new units on the market and are left with little margin for profitable support. Further squeezed by the increasing demands for performance on these products, third-party vendors are being forced to look for alternative sources of support revenue and are increasingly adopting offerings such as software support and other extended services in efforts to recover on the bottom line.

E

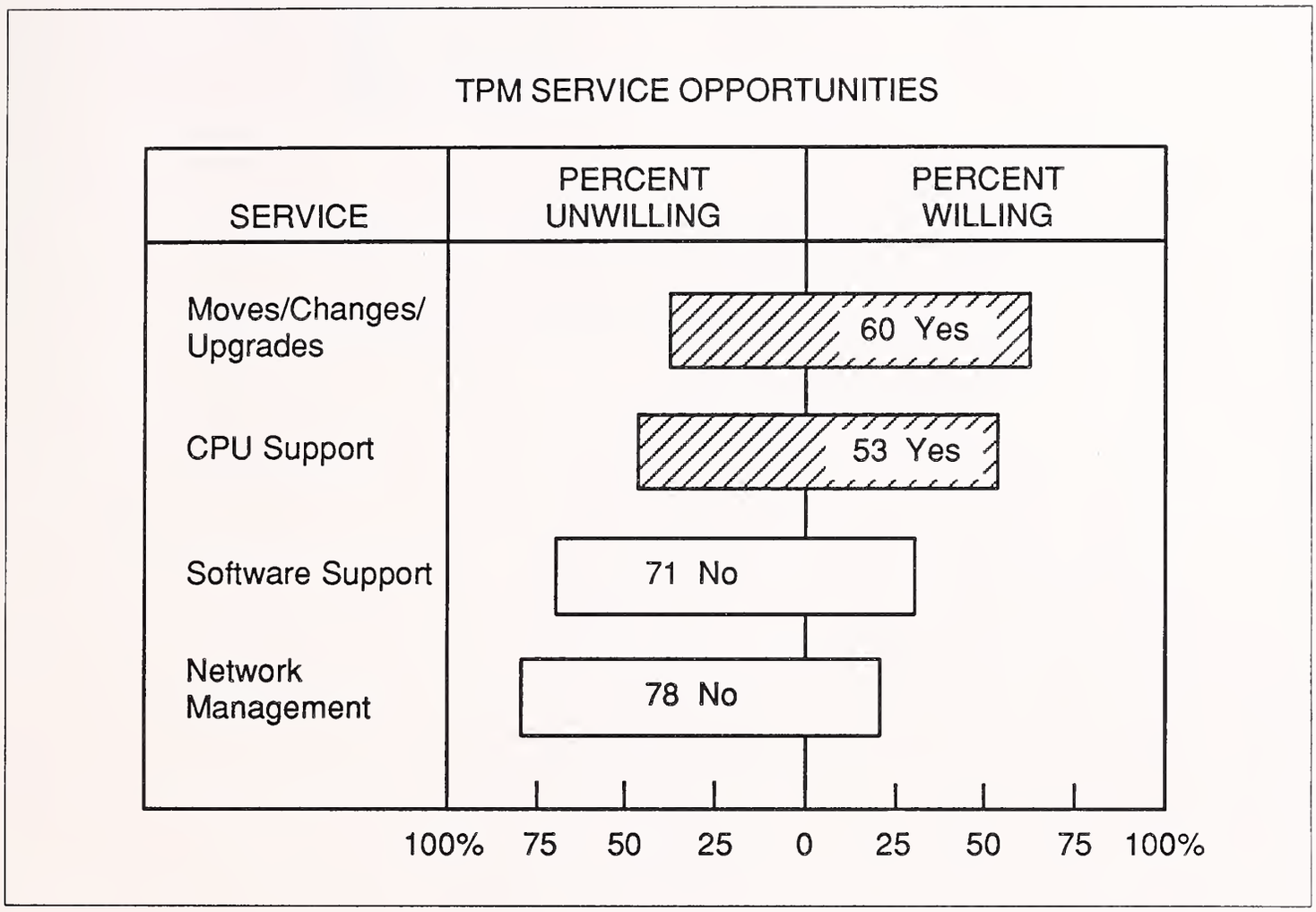
Support Vendors Looking to Enhance Falling Hardware Profitability

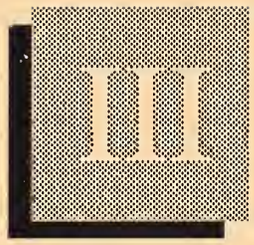
As market pressures force third-party vendors to venture out of their traditional hardware maintenance realm, TPM's are redefining their original (mixed vendor) "maintenance management" concept to include a variety of extended services. A number of major TPM players have introduced third-party software support over the past year, and additional support in terms of training, high level consulting, and even leasing and credit services are being adopted into TPM support offering menus.

TPM users as a group are currently expressing an overall limited acceptance of extended TPM servicing, as illustrated in Exhibit II-5. Although more willing to further utilize a third-party source for more services already somewhat identified for TPM support (such as system upgrades, site moves, or CPU support), the overall sample showed little interest in entrusting software services or network management work to their TPM vendor.

Just as third-party maintenance in its original form had to earn legitimacy in the market, so will the offering of such extended services as user awareness increases. Especially in high-growth areas such as software support and network management, third-party maintenance will eventually be welcomed as an alternative source of service.

EXHIBIT II-5





Third-Party Maintenance User Market

III

Third-Party Maintenance User Market

A

Changes in the Competitive Market

The face of the third-party maintenance market has changed dramatically over the past four years of INPUT's ongoing study. Five years ago, a fertile marketplace allowing for the rapid growth of newcomers; the TPM market has recently merged into a more stable phase, as weaker contenders are weeded out or absorbed into larger organizations. The players now remaining in the TPM arena represent a stronger breed of competition for manufacturer support operations.

Coinciding with this maturation of the competitive market has come the evolution of the TPM product market as traditionally supplied micro and peripherals third-party support expands further into the small and large systems sectors. Many TPMs are now operationally mature enough to offer support in these higher-end markets, and increasing numbers of third-party vendors are extending their service offerings to include the more profitable mini and mainframe products.

Although the microcomputer and peripherals sectors of the TPM market remain prominent, their significance is diminishing with the products' average market price. Market forces and technological advances have driven purchase prices to a level where proportional support pricing leaves little or no room for profit margin. Increasingly, lower-end products are becoming loss leaders serviced by TPM only as part of a larger, more lucrative systems contract.

The product composition of our sample reflects the rapid expansion of higher-end support in the TPM market. Compared to the 23% representation in last year's sample, third-party support of small systems products accounted for 60% of this year's sample (see Exhibit III-1). Large systems support, although comprising a small percentage (5% total of 1987 sample) of TPM-supported installations, still represents a relatively significant portion of revenues to supporting TPM vendors.

EXHIBIT III-1

SAMPLE BY PRODUCTS SERVED

PRODUCT	NUMBER OF RESPONDENTS	PERCENT OF SAMPLE
Large Systems	10	5
Small Systems	120	60
Micro Systems	31	16
Peripheral Products	34	17
Other	5	2
Total	200	100

Exhibit III-2 provides a list of typical products under TPM support within our sample. Well represented were both IBM and DEC product lines, reflective of their position as leading targets of the third-party market. Again, the shift toward mini and large systems service is supported by the common products listed.

EXHIBIT III-2

SAMPLE BY MANUFACTURERS MENTIONED

MANUFACTURER	NUMBER OF MENTIONS	TYPICAL PRODUCT
IBM	84	IBM 43XX, 30XX, System 38, System36, PC Systems
DEC	25	VAX 11/7XX, PDP 11/XX, Micro VAX
Data General	9	MV/10000, Nova Systems
Unisys	7	B9, B25 Systems, UTS Terminals
Basic Four	6	8010/BOSS, 730/BOSS Systems
Datapoint	6	6000Systems
Hewlett-Packard	5	3000 Systems, Printers
Prime	5	9X5X Systems, Disk Drives
Compaq	4	Deskpro 286 Systems
NCR	4	8500 Systems, Disk Drives
Wang	4	VS, OIS Systems
Concurrent	3	32XX Systems
*	2	

*The following manufacturers received two mentions: AT&T, Altos, Apple, Data Products, Printronix, Televideo, Texas Instruments, Wyse.

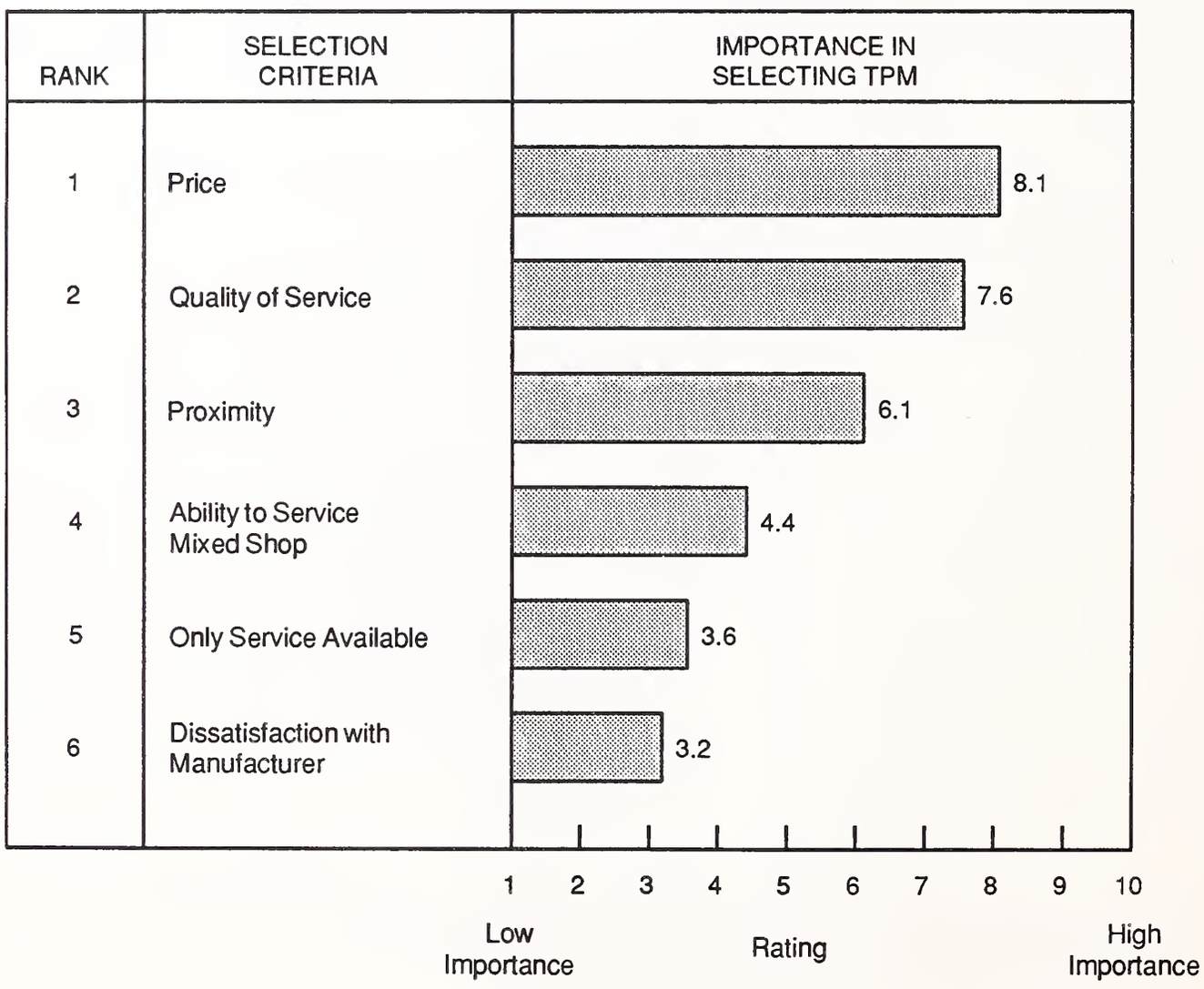
B

TPM Selection Criteria

As users evaluated potential sources of support for their systems and peripheral units, price remained the deciding factor in the final TPM vendor choice among our 1987 sample (see Exhibit III-3). As was the case among last year's sample, data processing officials are still under pressure to hold down overall costs, and they continue to recognize the value of third-party support in that effort.

EXHIBIT III-3

TPM USER SELECTION CRITERIA, 1987
ALL USERS



Note: Standard error of mean = 0.2

Many equipment vendors, in attempts to regain a hold on these eroding support revenues, have recently introduced reduced pricing and discounting practices in direct competition with the traditional TPM pricing levels. This, in turn, has increased the competitive nature of support pricing in the market and the importance of this factor among service vendor selection criteria.

Following very close behind price factors in this decision was the quality of service, a criterion which will no doubt continue to increase in importance as more critical mini and mainframe systems users join the ranks of third-party support customers. Quality of service will very likely resurface as a prime decision factor as market pricing eventually stabilizes and larger systems come to represent a major percentage of the TPM revenue mix.

Two factors which topped the list three years ago, proximity to the user site and the ability to service mixed-vendor hardware, have now declined in relative importance in the TPM decision. The number of hardware vendors now providing mixed-vendor support to at least a limited extent has increased dramatically since 1984, making this a "less unique" aspect of TPM service.

Geographic proximity to user site has declined in a similar manner as large, national third-party organizations grew and gained user confidence for fast and reliable service. The number of small local shops has, at the same time, decreased considerably since 1984 as the maturing TPM market shakes-out and consolidates its stronger players. Although the proximity of the TPM to the user site retains its importance in terms of vendor response to trouble calls, these other market factors have reduced its importance as a major decision criterion.

The final two criteria illustrate that third-party support has, in general, gained popularity on its own merit and not by default. Few of the sample respondents turned to TPM as their only alternative form of support, and frustration with manufacturer-supplied support rated even lower in importance in the support-purchase decision. TPM has become a reputable and established source of service among all product categories.

IV

Third-Party Maintenance Vendor Performance - All Products

IV

Third-Party Maintenance Vendor Performance - All Products

A

Response and Repair Performance

Regardless of the source of support, the average user's greatest concern lies with the response of their service vendor when their equipment goes down. Timely response and repair performance was by far the most common comment when users were asked what they most desired from their third-party vendor; users of manufacturer-supplied support in both the large and small systems categories commonly agreed upon this point.

Exhibit IV-1 compares mean response and repair performance of third-party users' support vendors to the performance of their hardware vendor's service team. Approximately half of the user sample reported the comparative statistics from their past experience with manufacturer-supplied support.

EXHIBIT IV-1

TPM VERSUS MANUFACTURER PERFORMANCE*
ALL USERS

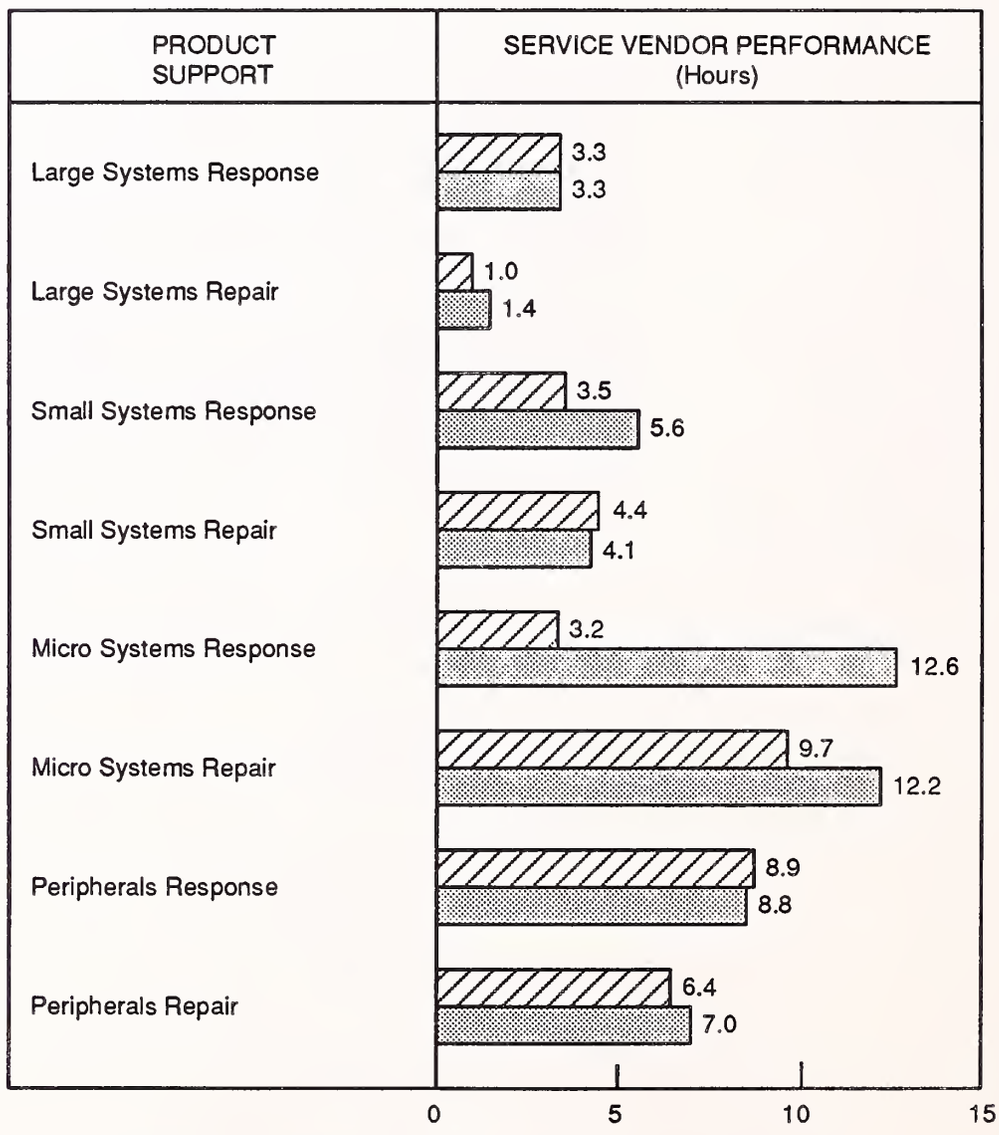
SUPPORT COMPONENT	TPM	MANUFACTURER
Response Time (Hours)	4.3	6.3
Repair Time (Hours)	4.8	4.9
Overall Satisfaction with Support**	8.3	7.1
Price of Service**	8.4	5.8

*As reported by Current TPM Users
**Rating: 1 = Low, 10 = High

On the average, users of third-party support reported improved response and repair performance from their TPM; mean time to respond improved by two full hours over manufacturer performance. When examining these statistics specific to product type, however, (see Exhibit IV-2) it becomes evident that these total sample averages are skewed by the drastic improvements experienced by microcomputer users who switched to third-party support. Average response for micro users was cut by over 9 hours, reducing the total repair time by nearly 12 hours.

EXHIBIT IV-2

TPM VERSUS MANUFACTURER SERVICE*
RESPONSE AND REPAIR TIMES



Third-party maintainers of large and small systems are likewise providing improved problem resolution times, although less dramatically than those of micro systems servicers. Small systems TPM total resolution averages 2.4 hours less than that of the manufacturer; improvements on large systems service average only around one-half an hour, manufacturer-supplied support's already low at 3.3 hour response and 1.4 hour repair times.

TPMs and equipment vendors have both benefitted from technological and design advances made in the mini and mainframe arena over the past few years, allowing for more effective problem diagnosis as well as more efficient repair procedures. Especially notable in mean repair statistics, both large and small system repair times dropped dramatically from last year's averages: Large systems' mean TPM repair times were reduced from 2.1 to 1.0 hour; small systems' from 7.0 to 4.4 hours.

Overall, TPM users expressed a higher satisfaction with their chosen source of support, especially in terms of price. As presented in Exhibit IV-1, satisfaction with manufacturer-supplied support was rated at 7.1, cost related factors at a low 5.8. Current TPM users rated both price and performance factors above 8 of 10, well over equipment vendor support ratings.

B

Analysis of Support Components

Exhibit IV-3 examines TPM user ratings of specific components of both hardware and software support, measuring overall third-party performance in each category against user needs. Of highest priority to TPM users was the quality performance of hardware support, rating a high 9.1. Users perceived the hardware support supplied by their TPM rating below this requirement, at 8.3, leaving some room for improvement by third parties.

Close behind this overall hardware service rating was user requirement for hardware engineer skill, rated at 8.9. A commonly mentioned concern of third-party users, field engineer (FE) ability, was rated at 8.2. Third-party users have traditionally expressed anxiety over the FE competence across the wide variety of products many support, but have, in general, expressed relative satisfaction with their abilities in the face of this challenge.

Although less than half of the respondents were currently receiving software support from their TPM vendor, these users valued overall software support and engineer (SE) skill at high levels. As a relatively new aspect of third-party support, third-party users expressed some of the greatest discrepencies between performance and need in software support and skill. Especially notable in SE competence, third-party performance in these areas will no doubt improve with time and accumulated experience in software support.

The availability of spare parts is another area of high priority among users of third-party support. Despite the battle between manufacturers and their third-party competition over ready access to parts for repair, TPM users rated their vendor's ability to procure and, just as importantly, handle spares for service at a high 8.5. Logistics concerns, directly affecting problem resolution times, are as vital to user satisfaction as spares acquisition.

EXHIBIT IV-3

TPM SERVICE PERFORMANCE REQUIRED VERSUS RECEIVED ALL USERS

SERVICE COMPONENT	RATING*		+/(-)
	REQUIRED	RECEIVED	
Training	7.0	6.4	(0.6)
Parts Availability	9.1	8.5	(0.6)
Remote Support	7.9	7.2	(0.7)
Hardware Engineer Skill	8.9	8.2	(0.7)
Software Engineer Skill	8.3	7.0	(1.3)
Software Support Overall	8.2	7.4	(0.8)
Hardware Support Overall	9.1	8.3	(0.8)

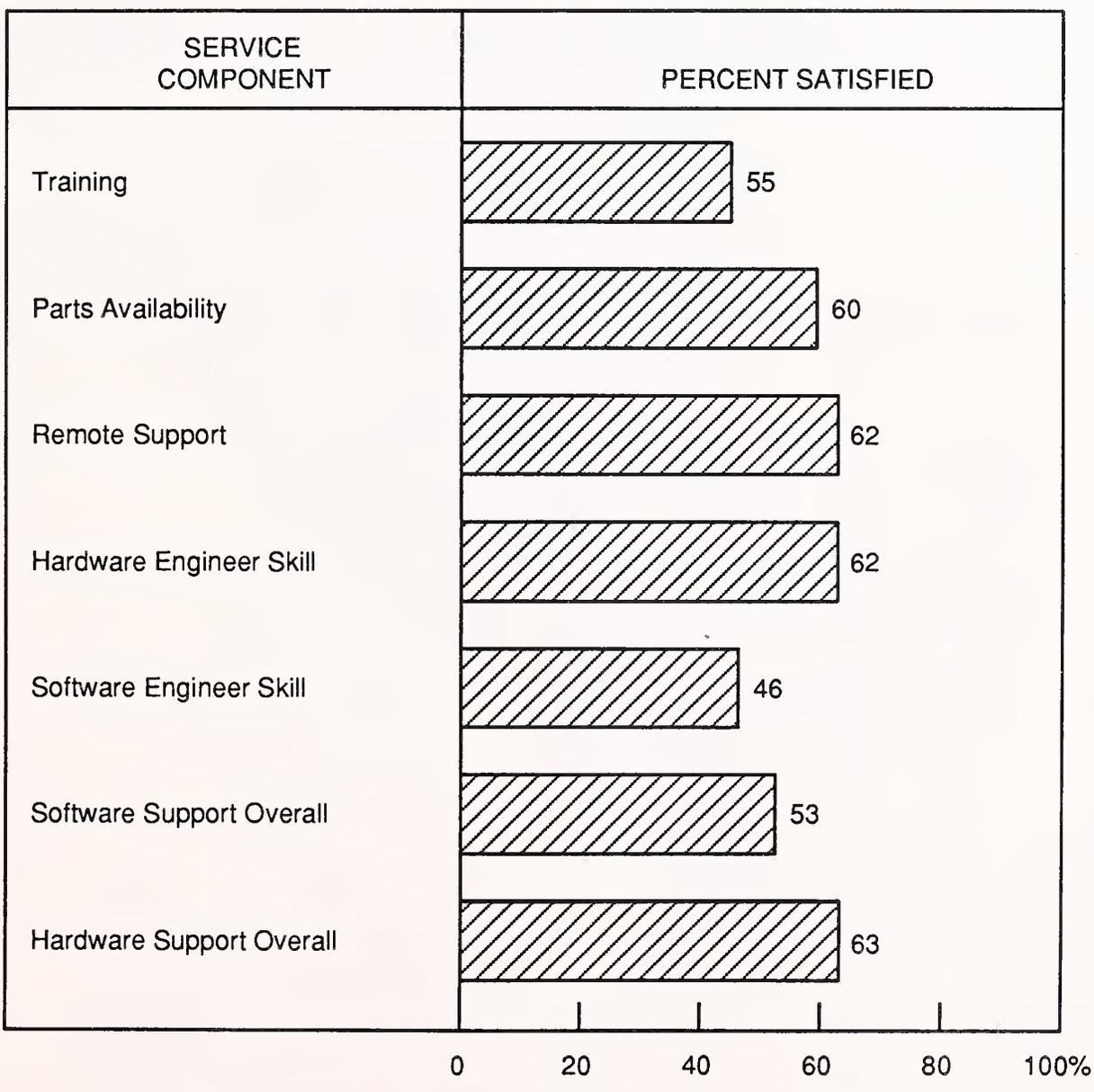
*Rating: 1 = Low, 10 = High Requirement/Performance

Standard Error of the Mean = 0.2

Relative user satisfaction with these services is charted in Exhibit IV-4, showing the majority of third-party users receiving support up to their standards within most all areas. Software engineer skill, an industry-wide concern, is the exception to this rule; only 43% of TPM users' SEs provide the level of competence users demand.

EXHIBIT IV-4

USER SATISFACTION WITH TPM SUPPORT
ALL USERS

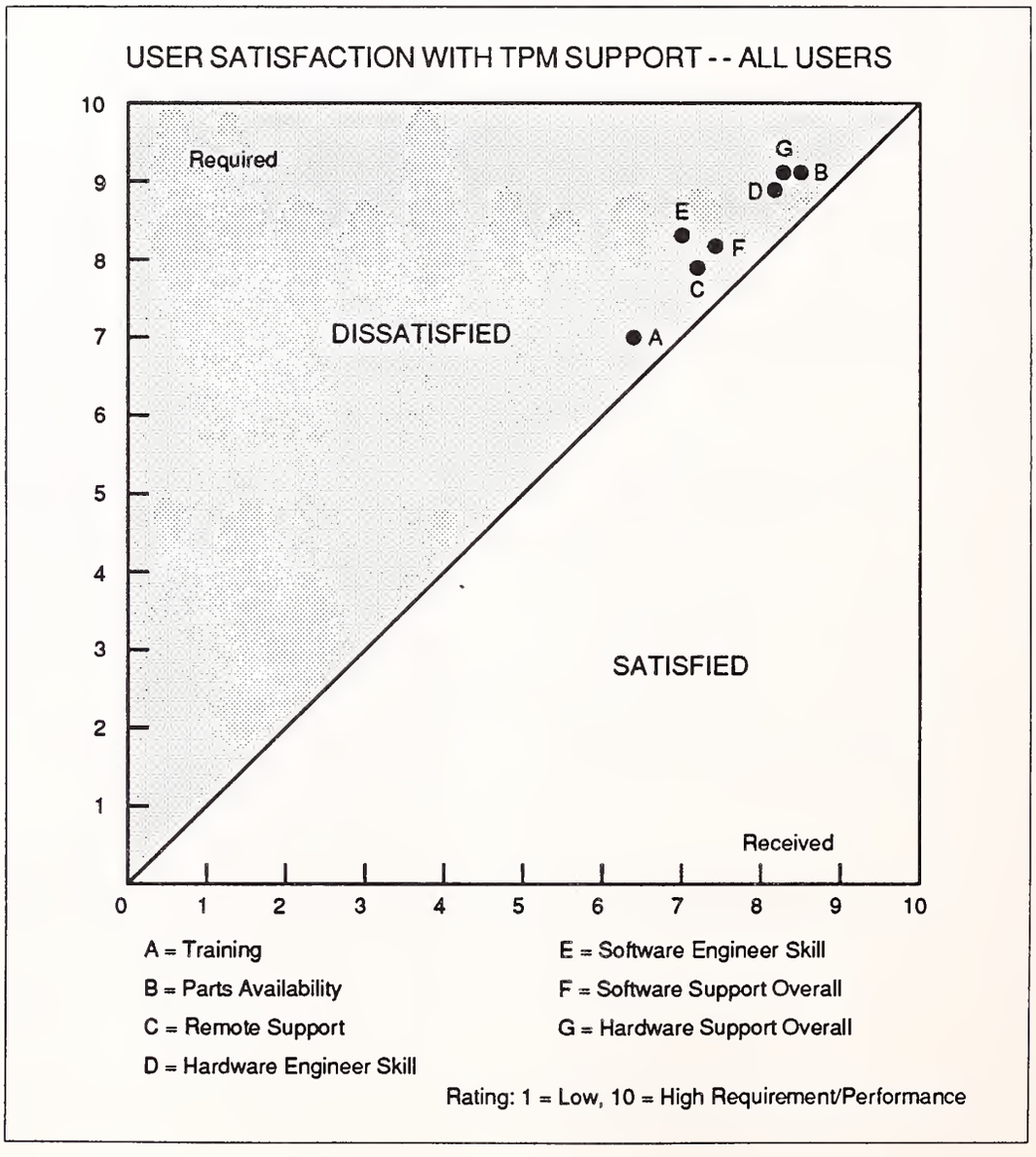


Hardware engineer skill and support overall remains satisfactory for 62% and 63% of the total sample, with satisfaction with parts availability and remote support (both key to overall hardware performance) following close behind.

The importance of remote support to third-party users will undoubtedly increase as more advanced systems come under the care of third-party vendors. Previously a market based in micro and peripheral support, the recent influx of small systems and mainframe users into the TPM business base will allow greater utilization of advanced remote support and, in turn, positively affect problem resolution times and overall user satisfaction within the total TPM market.

Exhibit IV-5 plots user needs against TPM service performance within these key areas of support. TPM support positioning in all areas (other than software) approaches the target area, but still falls short of user demand. Descrepancies in high requirement areas, including parts availability and hardware support overall, should be addressed by TPMs as priority areas for improvements in performance.

EXHIBIT IV-5



Third-party vendors must be aware that users who have defected from manufacturer-supplied support still remain a target for the equipment vendor, both in terms of future equipment sales and future support contracts. Approximately one-third of the TPM user sample reported that they had been approached by the manufacturer to return to their support while the user was under a current TPM agreement.

Most users were approached by the manufacturer by phone or personal sales call, with the representative attempting to gauge user satisfaction with the third-party service while selling the advantages of manufacturer-based support. At least 15% of those approached by the equipment vendor were provided with competitive bids on equipment currently under TPM contract. TPM vendors must be conscious of the unrelenting competition for their client base, especially as equipment vendors move to regain control of their slipping service revenues.

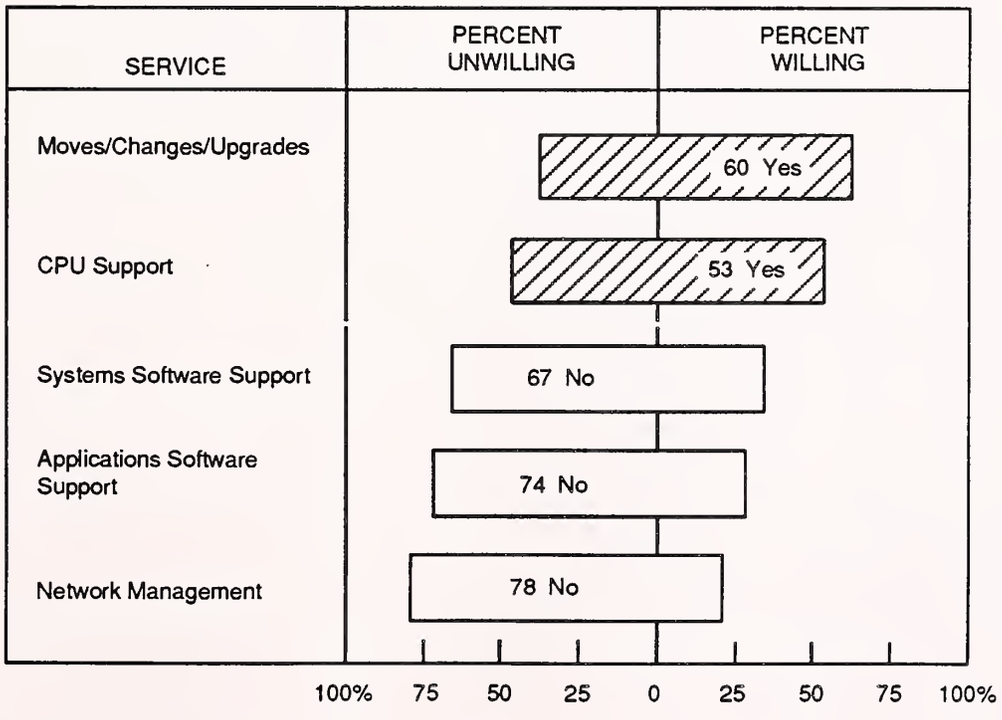
C

Market for Extended TPM Support

Users were also questioned about their willingness to extend their use of third-party sources for such services as CPU coverage, software support, and network management. Of those not currently using TPM for such services, a majority of the sample expressed a willingness to entrust such tasks as moves, system changes, and upgrades, as well as maintenance of their CPU to a third-party (see Exhibit IV-6).

EXHIBIT IV-6

WILLINGNESS TO USE TPM FOR EXTENDED SERVICES
ALL USERS

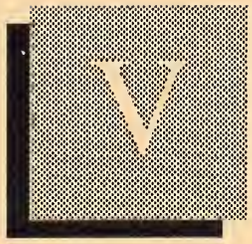


One-third of the sample currently involved in third-party hardware support revealed a willingness to use a TPM in support of their systems software as well; only around one-quarter of these users were willing to contract a third-party in support of their various applications software packages, however.

As more TPM vendors establish software support within their menu of services, user confidence in third-party supplied software support will undoubtedly increase. Although software support holds great promise for future profitability in TPM at the current time, user acceptance of TPM software services remains low.

In the same vein, a second category of extended services holding future promise for third-party vendors is network management. As profit margins decrease in traditional service areas, more third parties (and manufacturers alike) are necessarily turning their attention to the provision of "soft" services such as network management.

Although less than one-quarter of current TPM users are willing to enlist their third-party vendor for this type of extended service, as the TPM product base shifts more toward higher-end systems (mini and mainframe), demand for such services will inherently increase. As with the establishment of TPM as a software support source, interest in third-party network management will surely grow with the proven market establishment of TPMs in this capacity.



TPM Performance by Product Category

TPM Performance by Product Category

A

Large Systems Support

As noted earlier, the portion of our user sample enlisting third-party support for a mainframe system is relatively small (at 5% of total), reflecting the proportionally low TPM penetration within this segment of the market. TPMs have experienced their greatest difficulties in gaining the confidence of this group of users as more critical large systems support is typically entrusted to the system vendor.

This small percentage of the TPM market, however, represents a relatively large amount of revenue, and its importance continues to grow. As TPMs gain competence and legitimacy in the market (and users gain experience with and confidence in third-party sources), increasing numbers of large systems users are considering nonmanufacturer-supplied service for their mainframes.

1. Response and Repair Performance

The critical nature of most mainframe applications makes prompt problem resolution a major concern among large systems users. As illustrated in Exhibit V-1, this fact has obviously been well recognized and addressed among TPMs vying for service-market share, meeting response and beating repair times of their equipment vendor competition.

Both manufacturer and TPM vendors were responsive to these large systems users' downtime situations, each reporting to user sites within 3.3 hours of the initial call for assistance. Users reported their current third-party source of support effecting repair somewhat faster than even the original equipment vendor, offering a slight but meaningful edge to large systems users' critical uptime requirements.

As illustrated in Exhibit V-1, current large systems TPM users perceived the differentiation between manufacturer and third-party support to lie primarily with pricing. Of those users experienced with both sources of service, satisfaction with support was, overall, viewed as equal between TPM and manufacturer, leaving the purchase decision to be largely based

on price factors. This presents a major challenge to manufacturers attempting to regain control of support revenues and faced with the (very real) market perception of TPM as comparable support competively discounted.

EXHIBIT V-1

TPM VERSUS MANUFACTURER PERFORMANCE*
LARGE SYSTEMS USERS

SUPPORT COMPONENT	TPM	MANUFACTURER
Response Time (Hours)	3.3	3.3
Repair Time (Hours)	1.0	1.4
Overall Satisfaction with Support**	7.2	7.2
Price of Service**	8.4	5.4

*As Reported by Current TPM Users

**Rating: 1 = Low, 10 = High Satisfaction

2. Analysis of Specific Support Components

A number of specific components of large systems support contracts were discussed with users in terms of both their TPM vendor's performance, and in terms of user-defined needs within each area. As reported in Exhibit V-2, large systems user needs were greatest among hardware service components, rating system support overall, hardware engineer skill, and parts availability among the highest of all support components.

Of these hardware components, a major source of concern appears to be the skill of the field engineer (FE) as user requirements now reach a level of 8.6 points. FE performance fell to 7.7 (from 8.0 reported by last year's sample) and was often a point of comment by users discussing their most pressing support concerns.

EXHIBIT V-2

TPM SERVICE PERFORMANCE
REQUIRED VERSUS RECEIVED
LARGE SYSTEMS USERS

SERVICE COMPONENT	RATING*		+/(-)
	REQUIRED	RECEIVED	
Training	8.2	6.4	(1.8)
Parts Availability	8.6	8.0	(0.6)
Remote Support	7.6	6.6	(1.0)
Hardware Engineer Skill	8.6	7.7	(0.9)
Software Engineer Skill	8.1	7.2	(0.9)
Software Support Overall	8.8	7.8	(1.0)
Hardware Support Overall	8.8	8.0	(0.8)

*Rating: 1 = Low, 10 = High Requirement/Performance

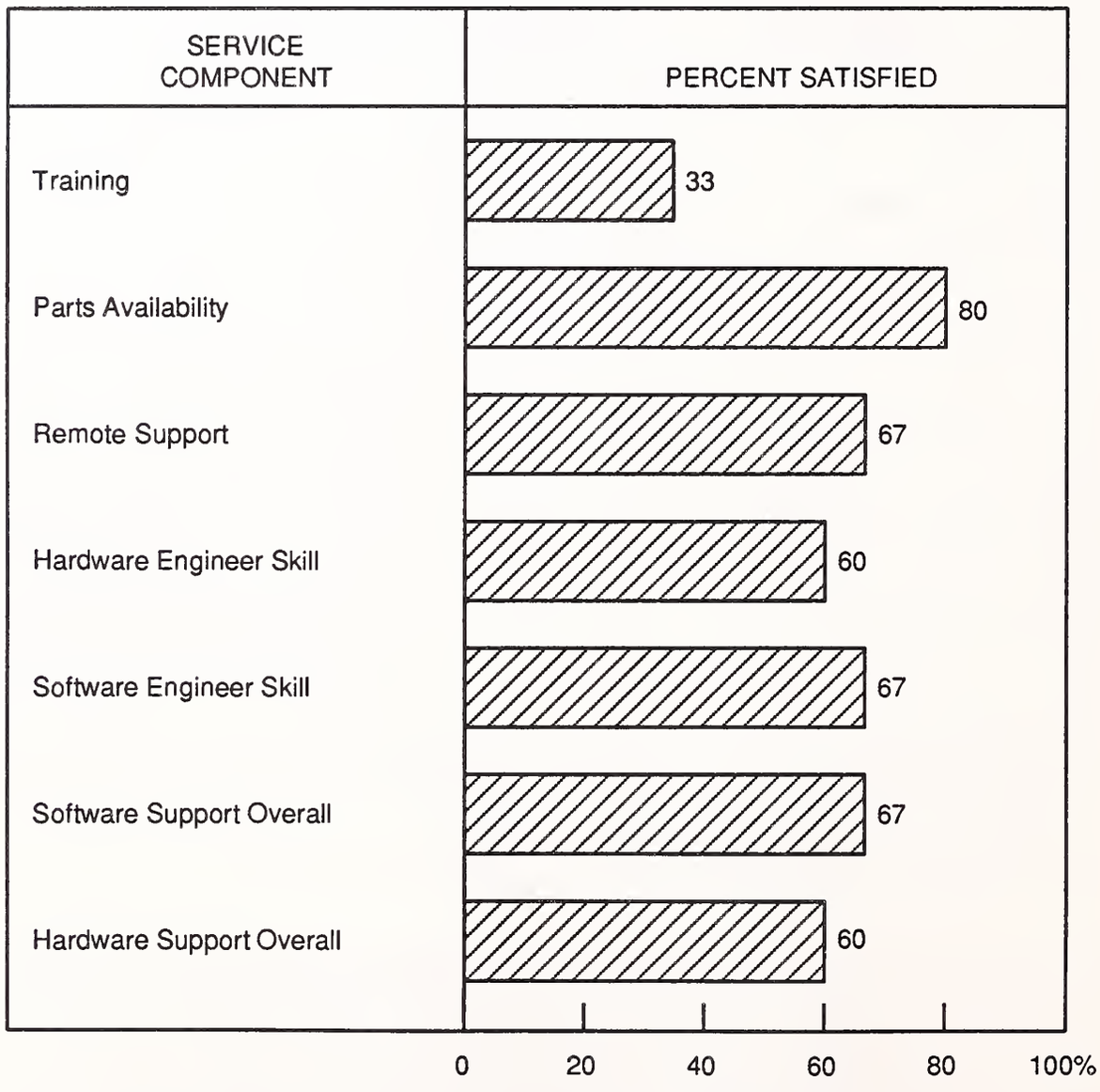
Standard Error of the Mean = 0.5

Exhibit V-3 discusses user satisfaction within each area of support, with hardware engineer skill falling among the lowest within the large systems sector. A problem has been reported within all product segments of the TPM market and users are calling for additional and ongoing training of FEs to assure their continued competence in face of the varied and increasingly sophisticated product mix coming under third-party care.

A second aspect of hardware support falling below user requirements was that of parts availability; TPM performance fell just short of user expectations (by 0.6 points). Considering specific cases within the sample, this discrepancy appears to be the product of a few dissatisfied users, the vast majority reporting their third-party vendor having no problem delivering spares. As seen in Exhibit V-3, 80% of TPM users received satisfactory spares support from their third-party vendor.

EXHIBIT V-3

USER SATISFACTION WITH TPM SUPPORT
LARGE SYSTEMS USERS



Viewing the overall hardware support provided by their third-party vendor, 40% of large systems users called for improvements (60% satisfaction shown in Exhibit V-3). Large systems users most often reported hardware maintenance as the most important aspect of their TPM's support at this time, and third-party vendors must address this discrepancy if further in-roads are to be made within the large systems arena.

Another notable situation is the opportunity open in the area of large systems training as users report a need of 8.2 (see Exhibit V-2), a significant increase from previous years' samples. This requirement is, by far, the highest among the product segments of the TPM market and could represent a significant area of business for third-party vendors willing to meet large systems user demands.

Although TPMs are not currently providing acceptable levels of training support (6.4 rating), user demand for such alternative services from their TPM is increasing rapidly as third-party vendors continue to prove their worth in other, more traditional service areas. Users are indicating that the window of opportunity is open to third-party vendors willing to provide such aspects of support.

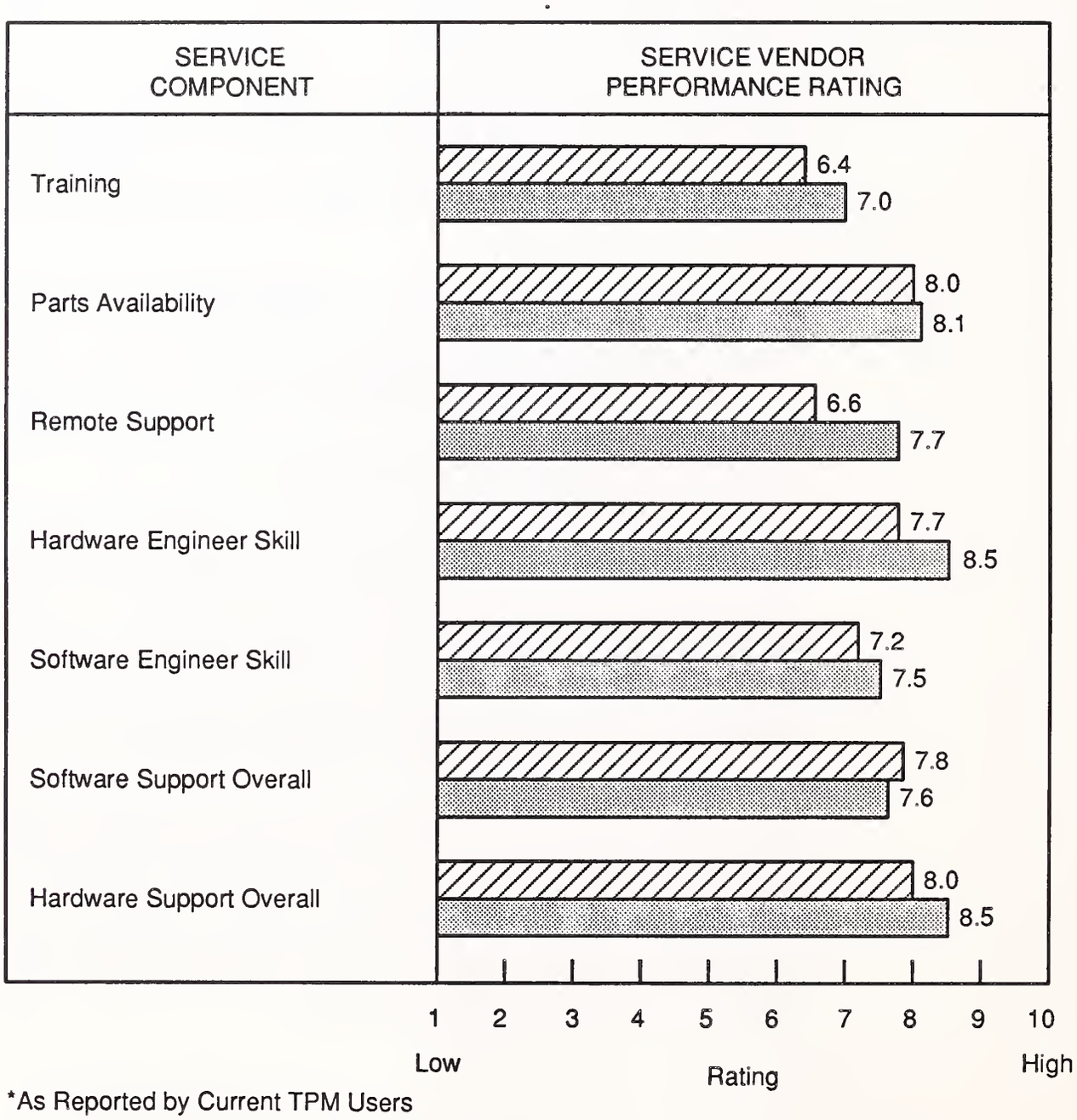
Among users employing their TPM for software support (90% of the large systems sample), satisfaction was slightly higher than in hardware service areas, two-thirds of the sample being content with the third-party software support provided. Although requirements overall were rated as high as those of hardware service, somewhat lower expectations in terms of engineer skill (rated 8.1, Exhibit V-2) allowed for a higher incidence of satisfaction with software (SW) support (67%, Exhibit V-3).

This combination of factors -- the major percentage of large systems users currently involved in TPM SW support and the high requirements reported for software services -- indicates a significant opportunity within the large systems sector of the market for third-party growth. TPM has established a solid reputation in the hardware arena and, with proper attention to users' needs, can profitably expand into large systems software support as well. Third-party maintenance has always worked to fill gaps between user demand and manufacturer provision, and proper attention to SW users in the large systems market can offer similar opportunities.

Shortcomings in the software support currently provided by manufacturers are revealed in Exhibit V-4, comparing user ratings of TPM SW services to large systems vendors' support. Low SW support ratings earned by equipment vendors will allow third parties an opportunity to offer improved service to this group of dissatisfied users. Exhibit V-5 shows that TPM SW support is currently holding a qualitative edge over manufacturer-supplied support and, although limited in scope, is satisfying two-thirds of third-party support customers.

EXHIBIT V-4

SUPPORT PERFORMANCE
TPM* VERSUS MANUFACTURER**
LARGE SYSTEMS USERS



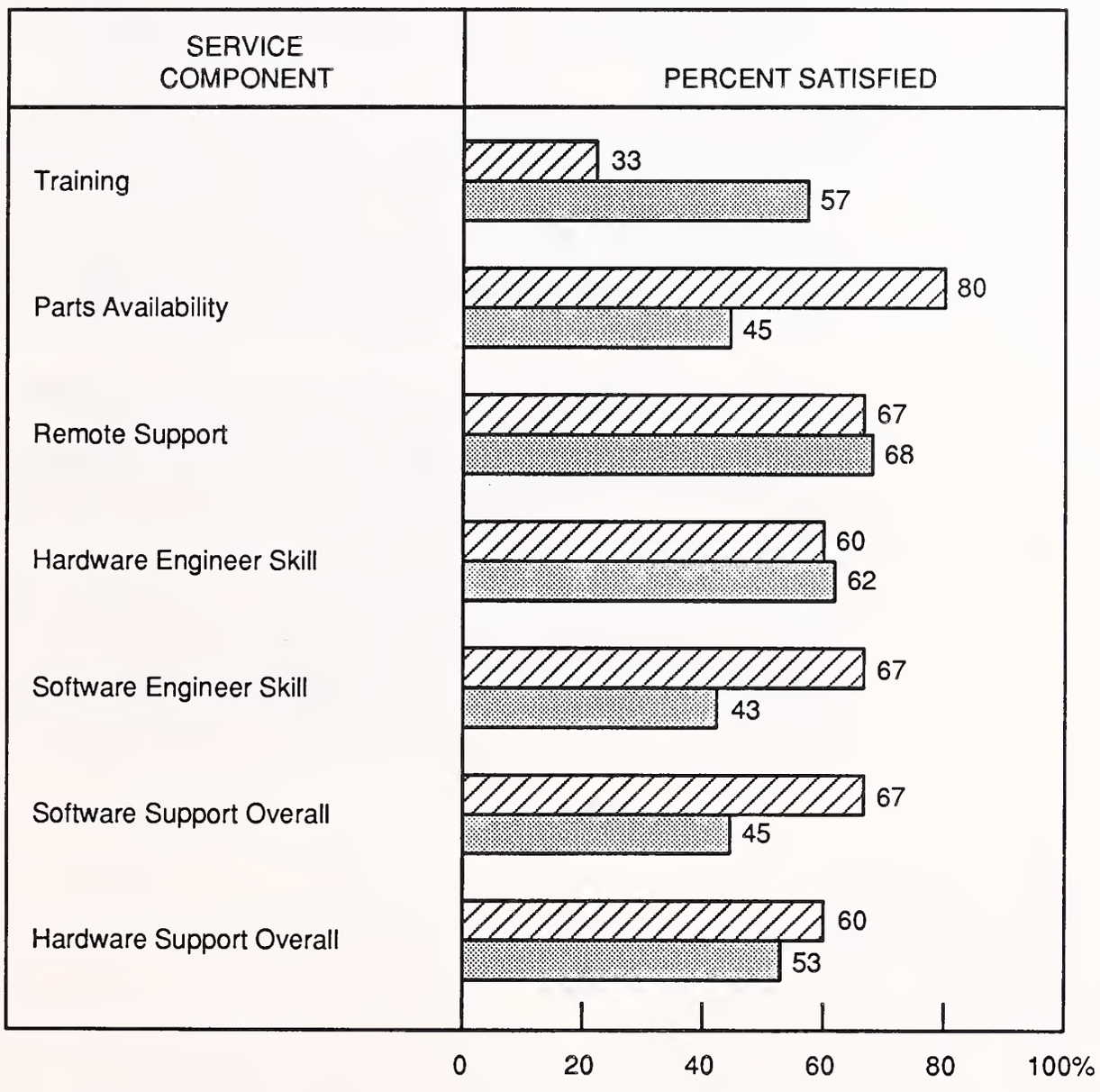
*As Reported by Current TPM Users

**As Reported by Current Manufacturer Service Users

TPM Manufacturer

EXHIBIT V-5

USER SATISFACTION WITH SUPPORT TPM* VERSUS MANUFACTURER** LARGE SYSTEMS USERS



*As Reported by Current TPM Users

**As Reported by Current Manufacturer Service Users

TPM Manufacturer

In the area of hardware support, users reported less consistency within third-party and manufacturer-supplied performance. Although average ratings of manufacturer performance were higher than TPM scores for overall hardware support (see Exhibit V-4), a greater percentage of TPM users expressed satisfaction with the level of service they received.

A similar situation surfaced in the area of parts availability, with TPM performance nearly matching equipment vendor ratings on average, yet with third-party users expressing a much higher level of satisfaction with TPM parts support. This, in part is due to the greater expectations users have for parts availability from the (manufacturer) source; many TPM users expect some difficulties in their vendor procuring spares.

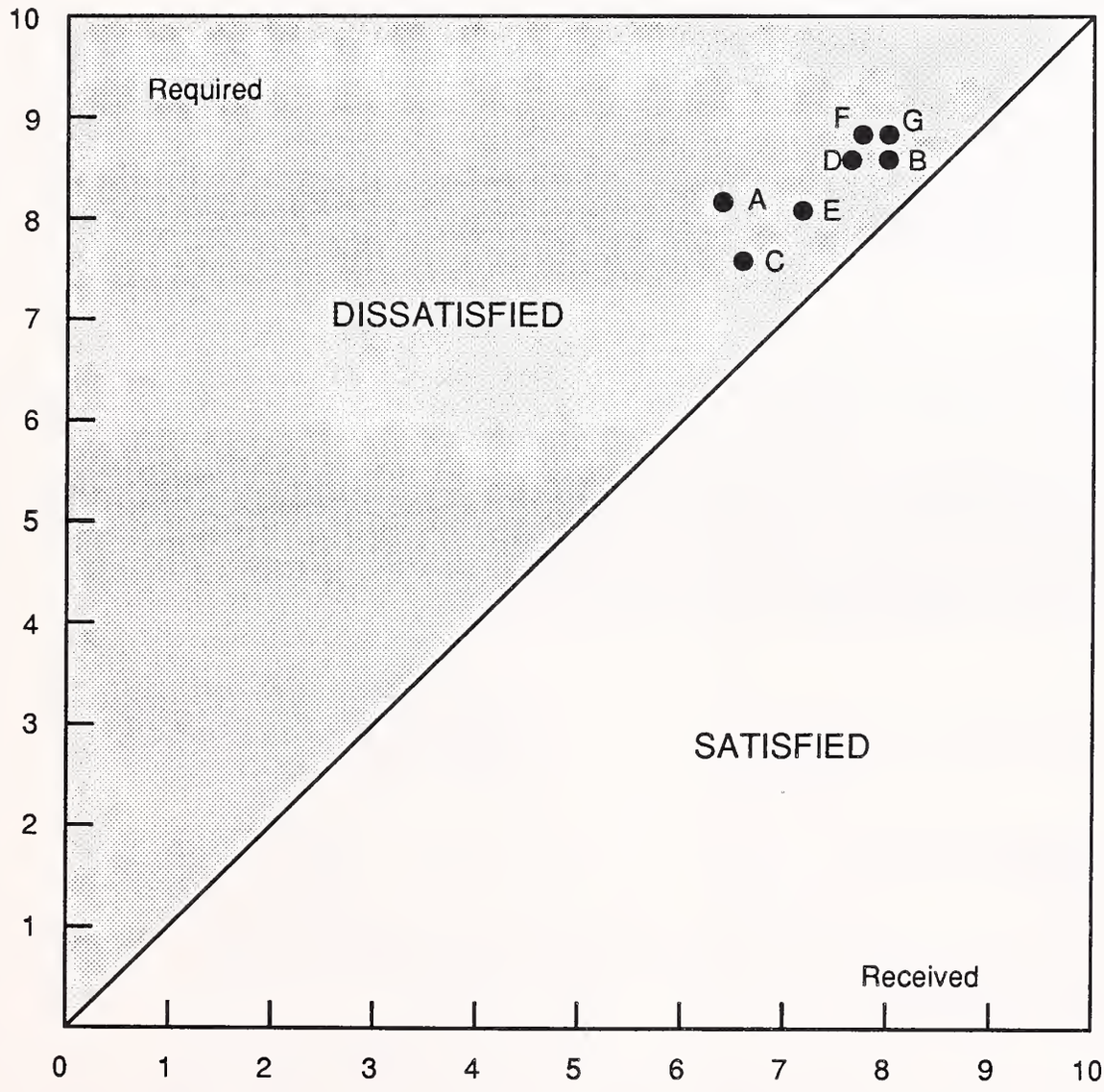
A second aspect of parts availability, that of inventory handling, also affects users' ratings of parts support. Although manufacturer-based support seems to hold an inherent advantage in this area, a large number of manufacturer-supplied support users voiced concern over over the ready availability of spare parts for their equipment. This attests to the fact that third-party vendors on top of users' logistics concerns do have a great degree of control over user perceptions in this area; problems cannot be wholly attributed to difficulties encountered in the procurement process.

Exhibit V-4 provides a clear representation of the relative support positioning of third-party vendors in the large systems market. Plotted against the needs expressed by TPM users, it is obvious that, despite some of these positive perceptions TPMs are now enjoying over manufacturer-supplied support, users are still calling for improvements in most areas.

Forty percent of large systems TPM users reported that they had been approached by their equipment vendor in efforts to regain their business via sales calls and competitive bids on their system support. The improvements indicated to TPM vendors in Exhibit V-6 are vital not only to increased market share, but in merely holding the current line as manufacturers become more aggressive in the fight for the service dollar.

EXHIBIT V-6

USER SATISFACTION WITH TPM SUPPORT
LARGE SYSTEMS USERS



A = Training
B = Parts Availability
C = Remote Support
D = Hardware Engineer Skill
E = Software Engineer Skill
F = Software Support Overall
G = Hardware Support Overall

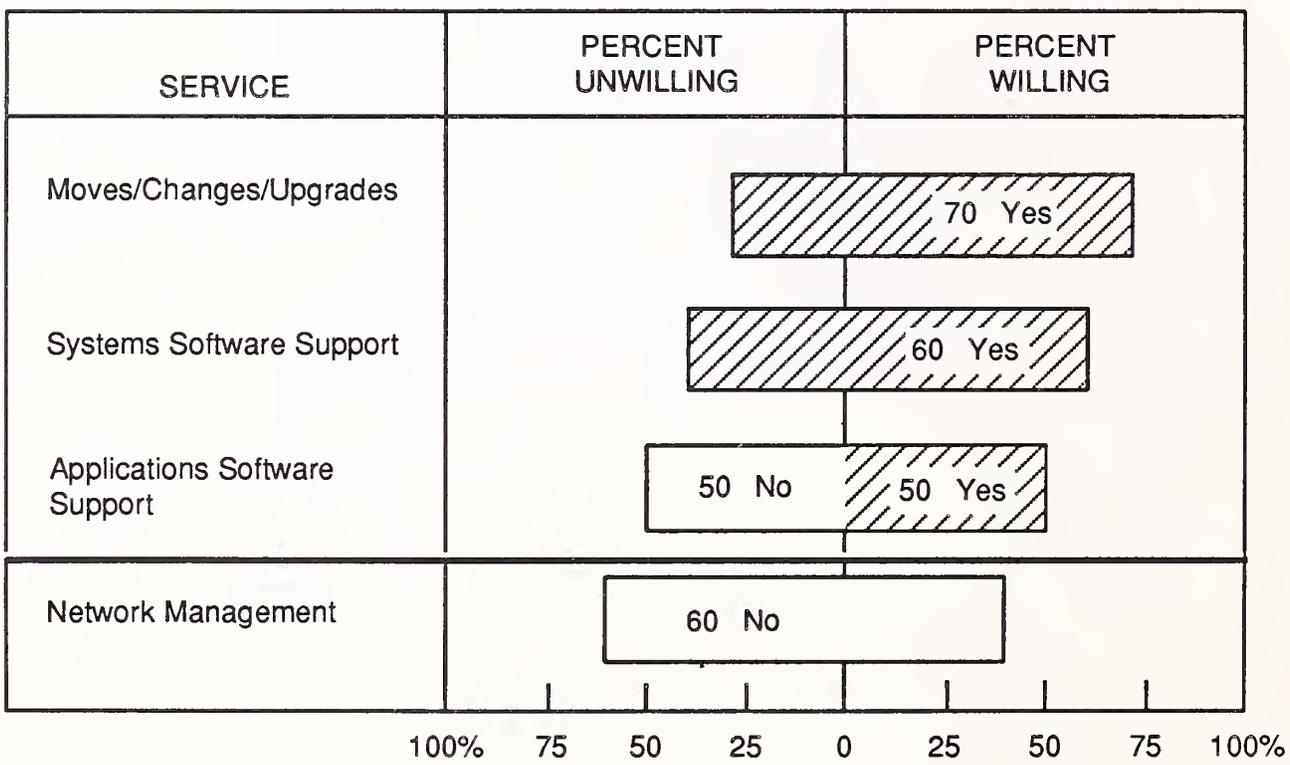
Rating: 1 = Low, 10 = High Requirement/Performance

3. Market for Extended TPM Support

Users of third-party support were asked to discuss their willingness to employ a TPM for extended support of their systems, and sample results are presented in Exhibit V-7. Large systems users (not currently using TPM in these capacities) expressed the greatest amount of interest in extending their third-party support, especially in areas such as moves/upgrades and different aspects of software support.

EXHIBIT V-7

WILLINGNESS TO USE TPM FOR EXTENDED SERVICES
LARGE SYSTEMS USERS



As discussed previously, third-party software support is rapidly gaining acceptability in the market, and especially among users of large systems. Sixty percent of users were willing to turn their systems software support over to third-party maintainers as a result of being both discouraged by poor support provided by their equipment vendor and encouraged by their experience with third-party support to date.

Users were somewhat less willing to depend on a TPM to support their applications software, less confident, perhaps, in a third-party's expertise over the numerous packages most large systems sites run. Still, half of the large systems market can represent considerable revenues for TPMs able to meet user applications software support demands.

User interest in third-party network management was somewhat lower, with 40% of the sample expressing a willingness to use TPM support in this capacity. Among the newest of services to be broached by TPM, user acceptance is still quite low in the market, but, as with other aspects of service entered into by third-parties, TPM network management will undoubtedly gain increasing acceptance over time.

As with applications software support, large systems users may have some anxiety over a third-party's ability to coordinate the range of tasks associated with network management. Correctly approached, however, users may grow to view network management as a natural outgrowth of the "single source" concept basic to TPM. Profits to be made in network management are, undoubtedly, greatest within the large systems sector, and acceptance of third-party in this capacity is greatest among this product group. As noted of TPM software support growth, even a relatively small portion of this market can represent a significant revenue base.

B

Small Systems Support

As the margin for maintenance profitability is squeezed by falling retail prices of micro and peripheral equipment, TPMs are being forced to expand these traditionally supported product lines to include higher-end systems support. TPM interest in the small systems (mini and superminicomputer) sector has boomed in the face of this revenue crunch, as indicated by the composition of our 1987 third-party user sample. Small systems users were heavily represented among this year's sample, comprising 60% of the total user group.

Although the proportions of this sample somewhat exaggerate the current TPM market composition, the importance of small systems service cannot be underestimated. The push by small systems vendors to replace mainframes with linked mini systems will continue to fuel the growth of this segment of the market and attract increasing numbers of third-party support vendors. Even now, competition for the lucrative support of mini systems is stiff between third parties as well as from the manufacturer side, as equipment vendors are less willing to forfeit this more profitable systems business to TPMs.

Users, however, stand to gain from this competitive situation as both sources of support enhance their offerings in contention for small systems business. In recognition of the situation, small systems user demands (and, in turn, vendor performance) are on the rise.

1. Response and Repair Performance

Exhibit V-8 evidences two aspects of the increased levels of support small systems users are enjoying in terms of problem resolution times. A key component, mean response time, is approaching the level provided in support of large systems, at a low 3.5 hours. Small systems users, in discussing their most pressing service concerns, expressed prompt response as by far the leading issue. According to these users, third-party vendors are surpassing manufacturer service in this aspect TPMs recognize the strategic importance of fast response to trouble calls of their small systems customers.

A second component, mean repair times, showed significant improvements among this year's sample, with turnaround time shaved from 7 hours in 1986 to a low of 4.4 hours this year. Closely rivaling manufacturer times, this performance coupled with the near 2 hour improvement on manufacturer response brings total small systems problem resolution time to under eight hours (7.9 hour average).

As a result of this commendable performance, users are expressing high overall satisfaction with their third-party service, rating TPM support at 8.5. Ratings were equally high in reference to the relative pricing of this service, well exceeding ratings earned of manufacturer-supplied support (at a pale 5.5). Manufacturer service organizations are facing stiffening competition from third-parties, in terms of both quality and cost of small systems overall support.

EXHIBIT V-8

TPM VERSUS MANUFACTURER PERFORMANCE*
SMALL SYSTEMS USERS

SUPPORT COMPONENT	TPM	MANUFACTURER
Response Time (Hours)	3.5	5.6
Repair Time (Hours)	4.4	4.1
Overall Satisfaction with Support**	8.5	7.0
Price of Service**	8.5	5.5

*As Reported by Current TPM Users

**Rating: 1 = Low, 10 = High Satisfaction

2. Analysis of Specific Support Components

In terms of specific aspects of this overall support, users were asked to rate both the level of service they required and the performance of their TPM within each area. Exhibit V-9 compares these ratings for each support component. Most striking are the high demands users reported within the hardware service areas -- parts availability rating 9.4, engineer skill and hardware support overall at 9.1 -- surpassing even those expressed by large systems users.

EXHIBIT V-9

TPM SERVICE PERFORMANCE REQUIRED VERSUS RECEIVED SMALL SYSTEMS USERS

SERVICE COMPONENT	RATING*		+/(-)
	REQUIRED	RECEIVED	
Training	6.7	6.1	(0.6)
Parts Availability	9.4	8.6	(0.8)
Remote Support	8.0	6.9	(1.1)
Hardware Engineer Skill	9.1	8.3	(0.8)
Software Engineer Skill	8.3	7.0	(1.3)
Software Support Overall	8.2	7.3	(0.9)
Hardware Support Overall	9.1	8.4	(0.7)

*Rating: 1 = Low, 10 = High Requirement/Performance

Standard Error of the Mean = 0.3

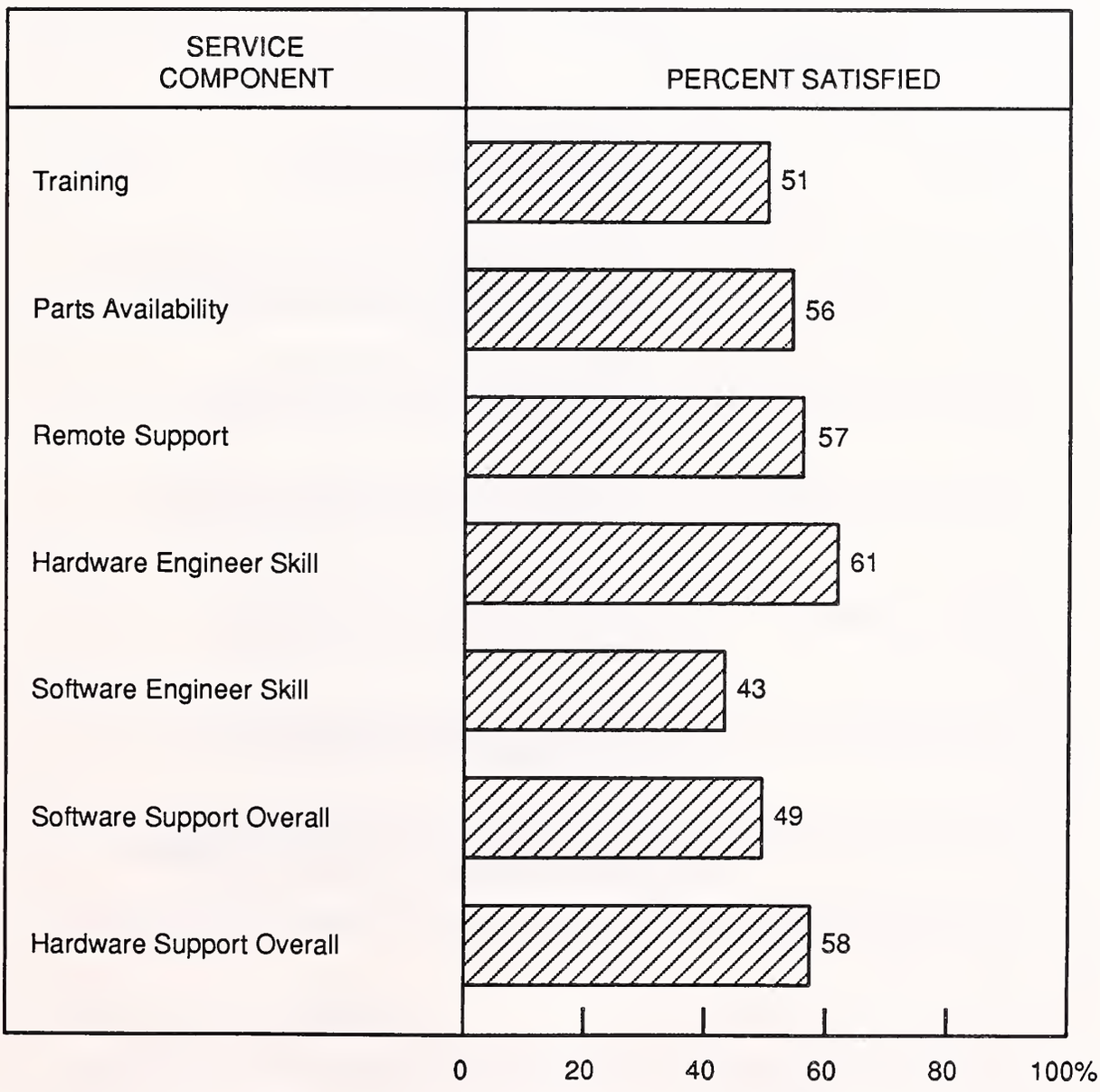
As highlighted in Exhibit V-9, small systems TPM support is falling short of these hardware demands even though vendors are performing at levels well exceeding even large systems service. The increasingly critical applications for which these advanced small systems are being marketed are driving user needs toward these high levels; efforts by small systems vendors to promote replacement of mainframes with networked mini systems will undoubtedly serve to keep these requirements high. TPM vendors intending to offer support to these user will have to be prepared to meet the high requirements of this growing market.

Although hardware support remains small systems users' top priority, close to half of our sample was experienced with third-party software

support and expectations in this area were nearly as high. Users were least satisfied with software aspects of support (as shown in Exhibit V-10), with less than half of respondents receiving the high level of service they required.

EXHIBIT V-10

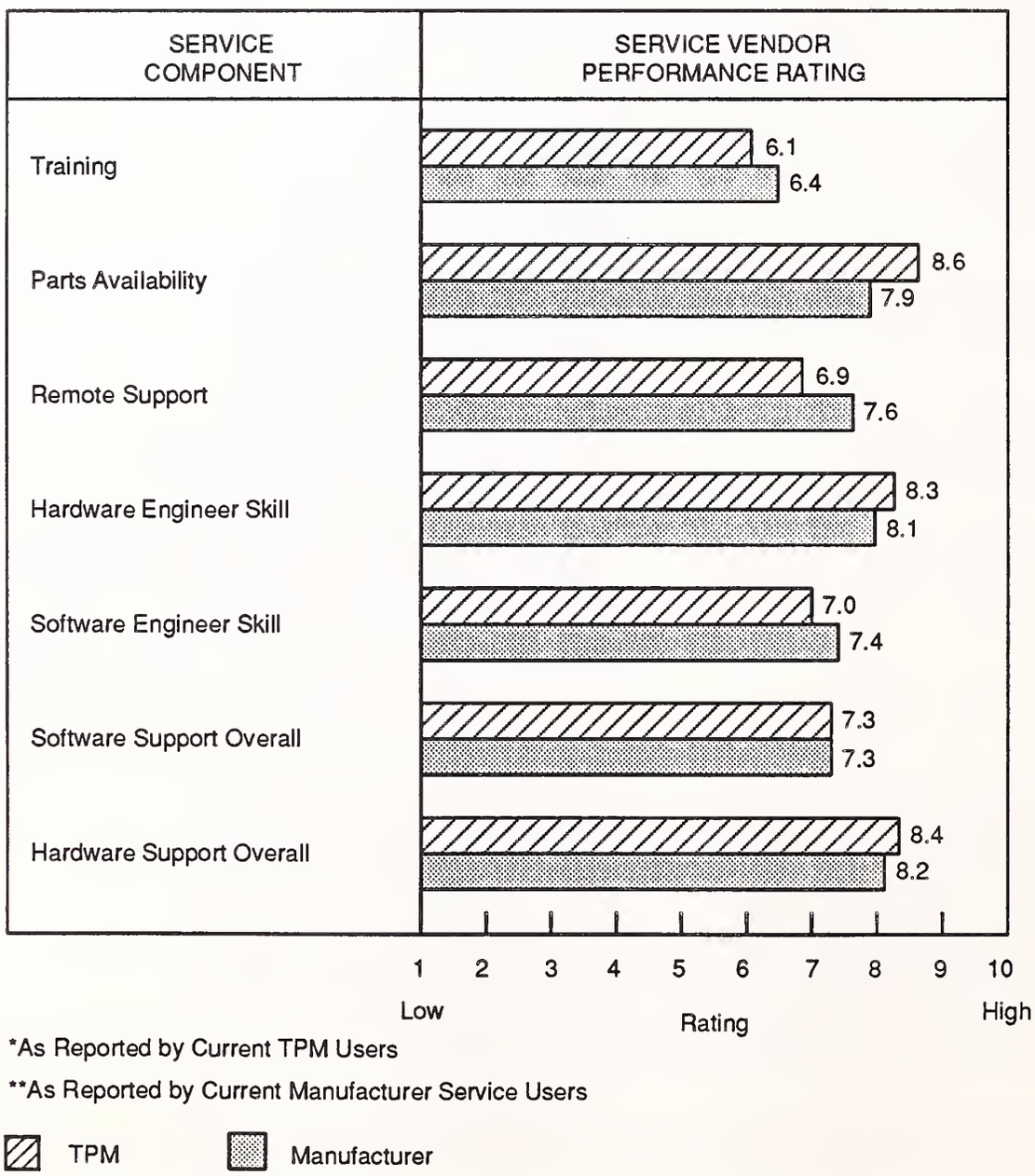
USER SATISFACTION WITH TPM SUPPORT
SMALL SYSTEMS USERS



Despite the discrepencies that stand between these user requirements and the third-party support they receive, Exhibit V- 11 exposes the edge users perceive in their third-party support. TPMs rate above manufacturer-supplied support in every aspect of hardware service. Even in the more recent undertakings of software support, TPMs are giving manufacturers a run for the money, offering users equivalent overall support and close approximations of engineer skill.

EXHIBIT V-11

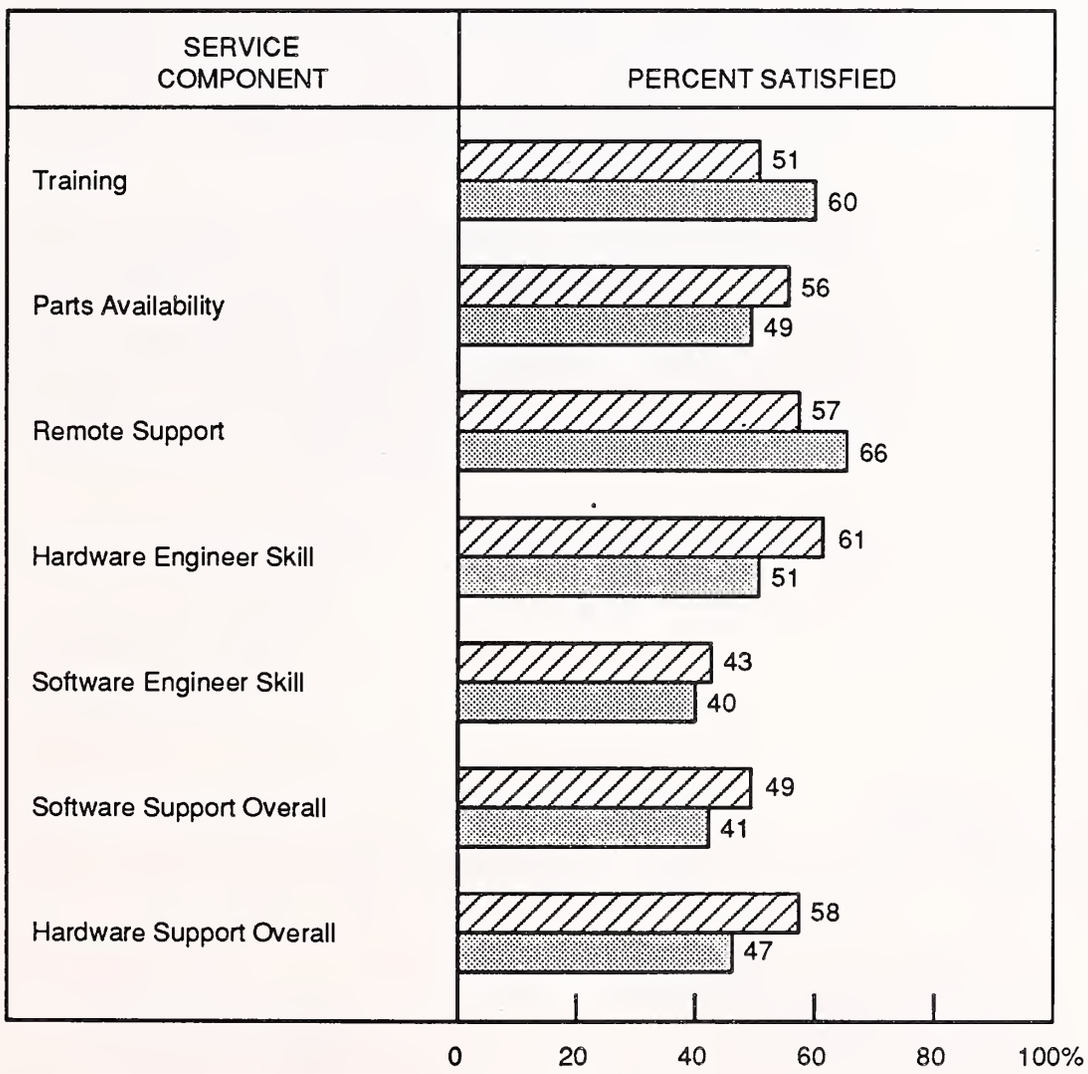
SUPPORT PERFORMANCE
TPM* VERSUS MANUFACTURER**
SMALL SYSTEMS USERS



Satisfaction with support received from third-party vendors surpasses equipment-vendor support in all higher priority areas among software and hardware services alike (see Exhibit V-12). Especially notable in the more established hardware components (TPMs beating manufacturer ratings by 10% and over), third-party vendors appear to be better adapting their offerings to suit small systems user needs.

EXHIBIT V-12

USER SATISFACTION WITH SUPPORT
TPM* VERSUS MANUFACTURER**
SMALL SYSTEMS USERS



*As Reported by Current TPM Users

**As Reported by Current Manufacturer Service Users

TPM Manufacturer

Of note among these aspects of hardware service is the high satisfaction TPM users are experiencing with parts support. Traditionally perceived as a trouble area for third-party vendors, small systems users are reporting better performance from TPMs than users of manufacturer-supplied support (8.6 to 7.9, shown in Exhibit V-11).

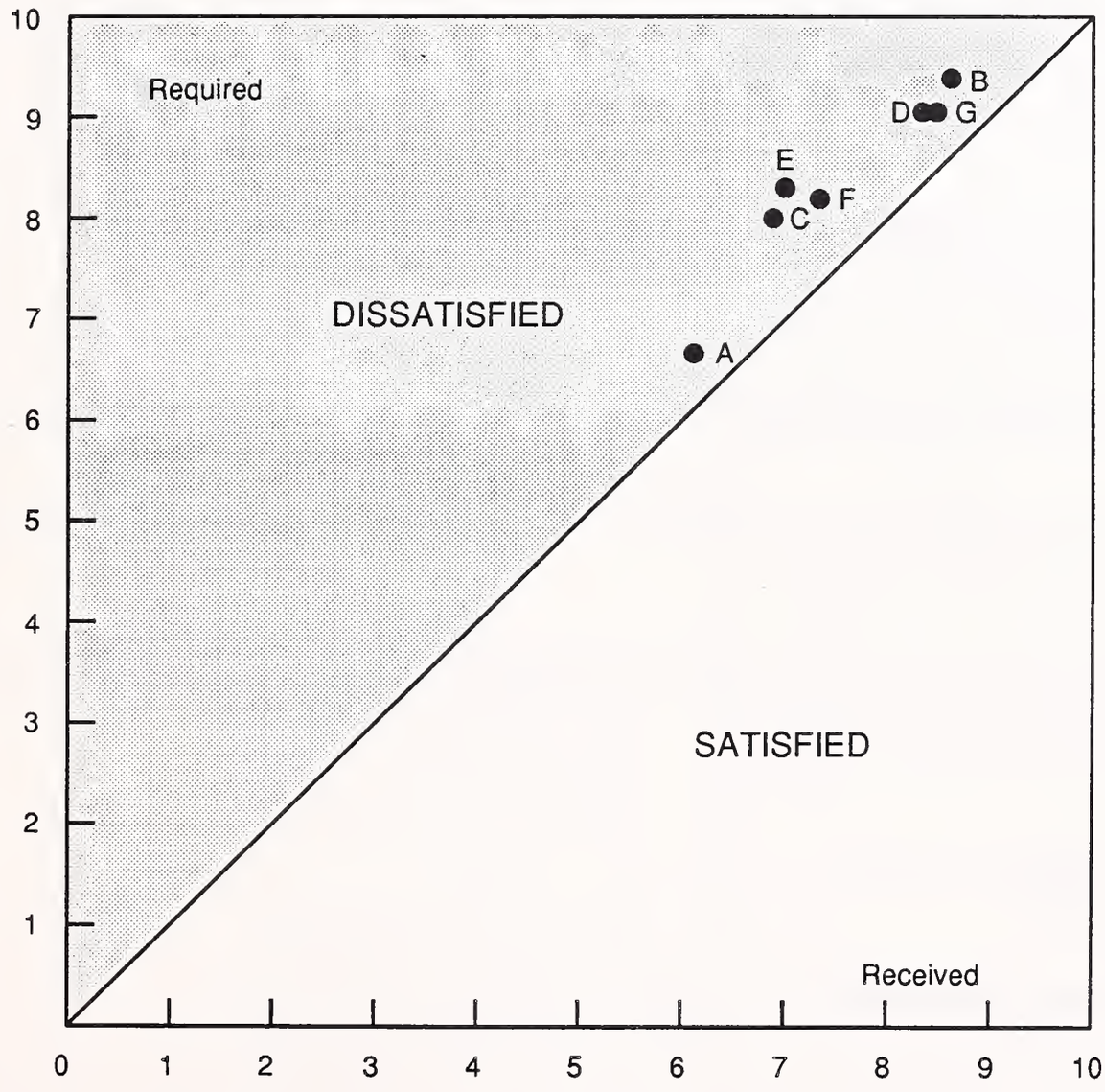
These ratings stem from a level of frustration many manufacturer-serviced users are reporting, not, obviously, in the procurement end of parts support but rather in the determining area of logistics. Users are seeing that a TPM with an effective parts distribution system can outperform even the manufacturer source with a full inventory of often unavailable spares. Third-party vendors, more readily prepared for the need to locate and courier scarce parts to a user site, are uncovering as false the perceived security many users have associated with manufacturers' abilities to provide spares.

Despite the relative satisfaction TPM users are reporting over manufacturer supplied support, Exhibit V-13 reinforces the fact that small systems user needs are still lying well above the performance of the average third-party vendor. By plotting current performance against user defined requirements in each of these areas, demanded improvements are clearly outlined.

Increasing competition for the small systems support dollar indicates the urgent attention third parties should pay to these problem areas. Over one-third of small systems users interviewed reported that there had been some attempt made by the equipment vendor to regain their business, either in terms of "remarketing" their services to the user or by way of lower bids on covered systems. Regardless of the attempt, the aggressive stance manufacturers are taking against TPM encroachment reinforces the need for third-party vendors to monitor and act upon user requirements.

EXHIBIT V-13

USER SATISFACTION WITH TPM SUPPORT SMALL SYSTEMS USERS



A = Training
B = Parts Availability
C = Remote Support
D = Hardware Engineer Skill
E = Software Engineer Skill
F = Software Support Overall
G = Hardware Support Overall

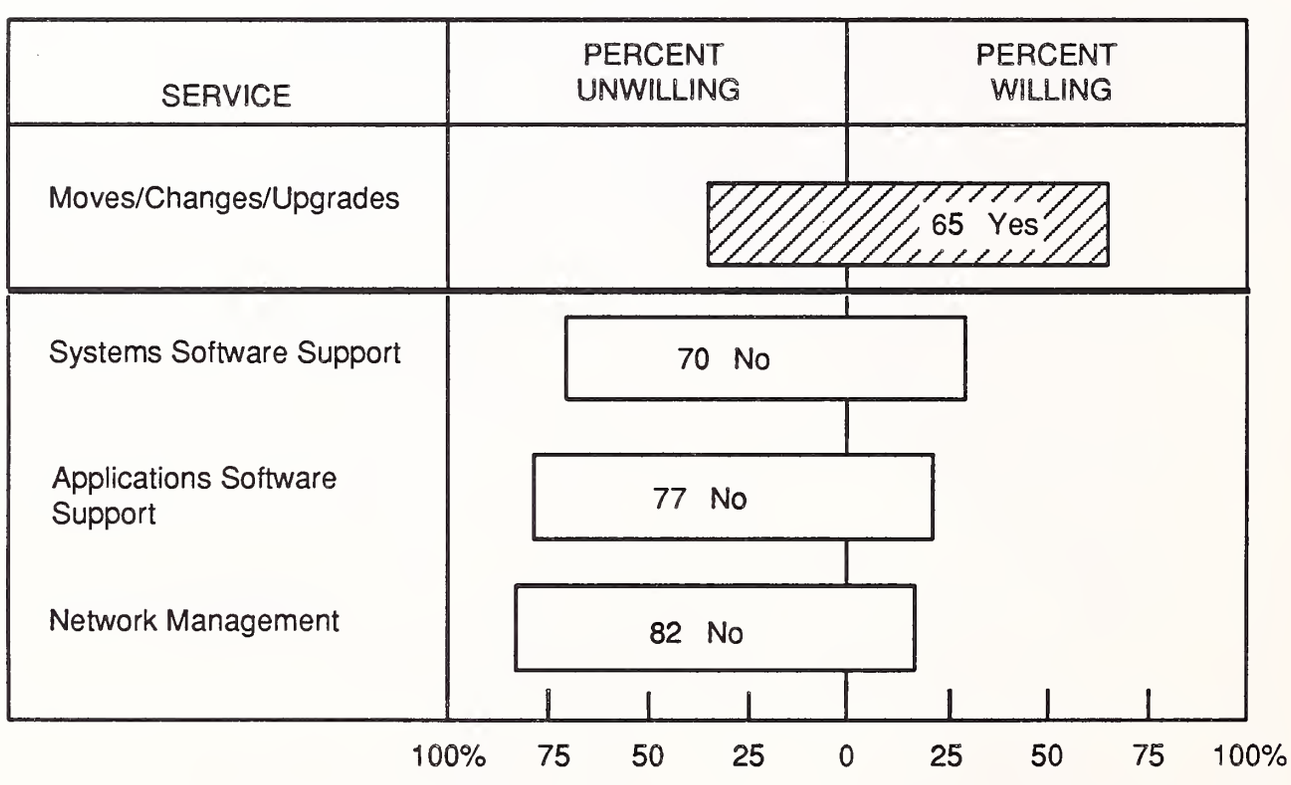
Rating: 1 = Low, 10 = High Requirement/Performance

3. Market for Extended TPM Support

As highlighted in Exhibit V-14, small systems users expressed a limited interest in expanding their use of TPM into new areas of support at this time. Although 65% of the sample were willing to employ their third-party vendor in upgrades, moves, or changes to their system, only 23 to 30% of small systems users (not currently using their TPM in this capacity) were currently open to including software support in their third-party contract.

EXHIBIT V-14

WILLINGNESS TO USE TPM FOR EXTENDED SERVICES
SMALL SYSTEMS USERS



The software side of third-party support, however, is becoming increasingly important to the bottom line as competitive forces drive the margins on traditional hardware maintenance support down. This low reported willingness to employ TPM is at least partially attributable to the relative newness of third-party software support, not yet having established a positive reputation within the market. Increasing numbers of TPMs will be turning to software related services to augment their slipping hardware revenues, and the acceptability of TPM as a SW support source will grow with this market exposure.

In the same vein, nontraditional extended services such as network management will be increasingly introduced to the TPM market as another defense against falling hardware support profitability. As greater numbers of TPMs (and manufacturers in the same battle) stress the viability and value of such extended services in the market, user awareness and acceptance will undoubtedly increase in these areas.

The evolving small systems segment should be an especially fertile ground for the market of professional services, such as consulting and network management, as minicomputer manufacturers continue to push the value of linked systems in the high-end of the market. As more small systems come under use as components of these networked systems, the benefits of services such as network management will made increasingly obvious, ripening the market for acceptance of TPM offerings of this type.

C

Micro Systems Support

As the third-party maintenance market has matured, the emphasis on lower-end products, especially the microcomputer sector, has dramatically declined. Initial projections of the size of the PC products market have been radically reduced, and the majority of sizable TPMs once specializing in micro repair are now shifting their emphasis toward the more profitable higher end of the market.

In addition, rapidly declining micro systems purchase prices have all but eliminated the margin for profitable support, with large corporate installations remaining as one of the few account targets providing sufficient support revenues. Few TPMs remain who do not undertake PC support only as a part of a larger, more lucrative contract covering more profitable components of the larger system.

1. Response and Repair Performance

As a result of the growing incidence of service contracts covering both PCs and larger systems and peripherals, microcomputer users are receiving problem resolution times equivalent to those associated with higher-end units covered. As shown in Exhibit V-15, micro users are reporting response times averaging just over three hours, paralleling performance reported by large and small systems samples. Manufacturers, less likely to be offering a single contract covering such varied levels of equipment, are providing micro users with much higher response times, averaging over 12 hours.

Repair turnaround showed improvements over last year's analysis, down to 9.7 hours compared to 12.4 hours in 1986. Manufacturer-support times remain at this higher level (at 12.2 hours), combined problem turnaround reported at over 24 hours from micro vendors. Micro manufacturers attempting to regain control of service revenues will have to seriously weigh the costs associated with matching these low TPM resolution times. The costs of competing with third-parties on this scale may well outweigh any incremental gains to be made in PC repair revenues.

Within our sample, one-fourth of users reported their micro manufacturer having approached their organization in attempts to regain PC maintenance business. A low percentage in comparison to other product groups, it appears that many micro manufacturers feel the gains to be made do not justify the effort involved in recapturing the PC service dollar.

Micro users remain very satisfied with the support performance of their TPMs, rating overall support at 8.6 and satisfaction with service pricing close behind at 8.5. Satisfaction with manufacturer supplied support fell well below these ratings, overall service performance rated at 6.0, and subsequent satisfaction with price at 5.8. TPMs appear to be enjoying a definite edge over manufacturer-supplied support at this end of the market.

EXHIBIT V-15

TPM VERSUS MANUFACTURER PERFORMANCE*
MICRO SYSTEMS USERS

SUPPORT COMPONENT	TPM	MANUFACTURER
Response Time (Hours)	3.2	12.6
Repair Time (Hours)	9.7	12.2
Overall Satisfaction with Support**	8.6	6.0
Price of Service**	8.5	5.8

*As Reported by Current TPM Users

**Rating: 1 = Low, 10 = High Satisfaction

2. Analysis of Specific Support Components

In examining specific components of overall support, micro users revealed their focus on hardware support, as the majority of users remaining inexperienced with software services, training, or other aspects of PC support (see Exhibit V-16). Overall hardware support and engineer skill level are considered top priority, receiving 9 point (plus) requirement ratings. Users regard their TPMs performance in hardware services overall to rate just below the required level, at 8.7.

Pulling this overall rating down is users' concern over hardware engineer skill, falling below user requirements by 0.9 points. Commonly mentioned among users' most pressing service concerns, perceptions of FE competence are falling below users' growing expectations.

EXHIBIT V-16

TPM SERVICE PERFORMANCE REQUIRED VERSUS RECEIVED MICRO SYSTEMS USERS

SERVICE COMPONENT	RATING*		+/(-)
	REQUIRED	RECEIVED	
Training	**	**	0
Parts Availability	8.5	8.7	0.2
Remote Support	**	**	0
Hardware Engineer Skill	9.0	8.1	(0.9)
Software Engineer Skill	**	**	0
Software Support Overall	**	**	0
Hardware Support Overall	9.1	8.7	(0.4)

*Rating: 1 = Low, 10 = High Requirement/Performance

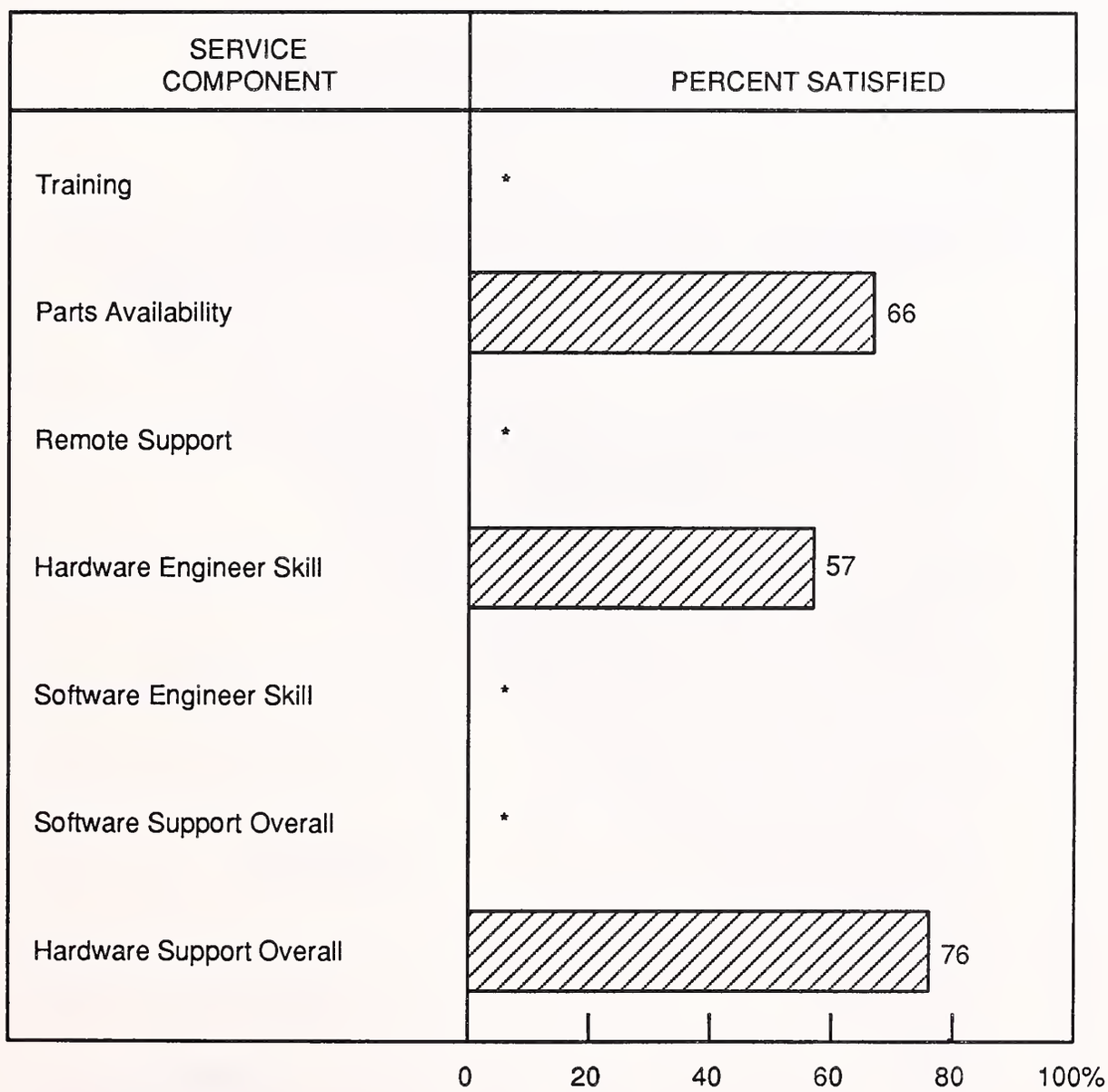
**Insufficient Response

Standard Error of the Mean = 0.6

On the other hand, in a second component of overall hardware support, spare parts availability, TPMs were considered to be performing above user expectation on average as micro users rate their spares support highest among all product samples. Less than 10% of micro users reported their TPM vendor having any problems acquiring spares over the last year, and close to two-thirds of our sample were satisfied with parts support (shown in Exhibit V-17).

EXHIBIT V-17

USER SATISFACTION WITH TPM SUPPORT MICRO SYSTEMS USERS

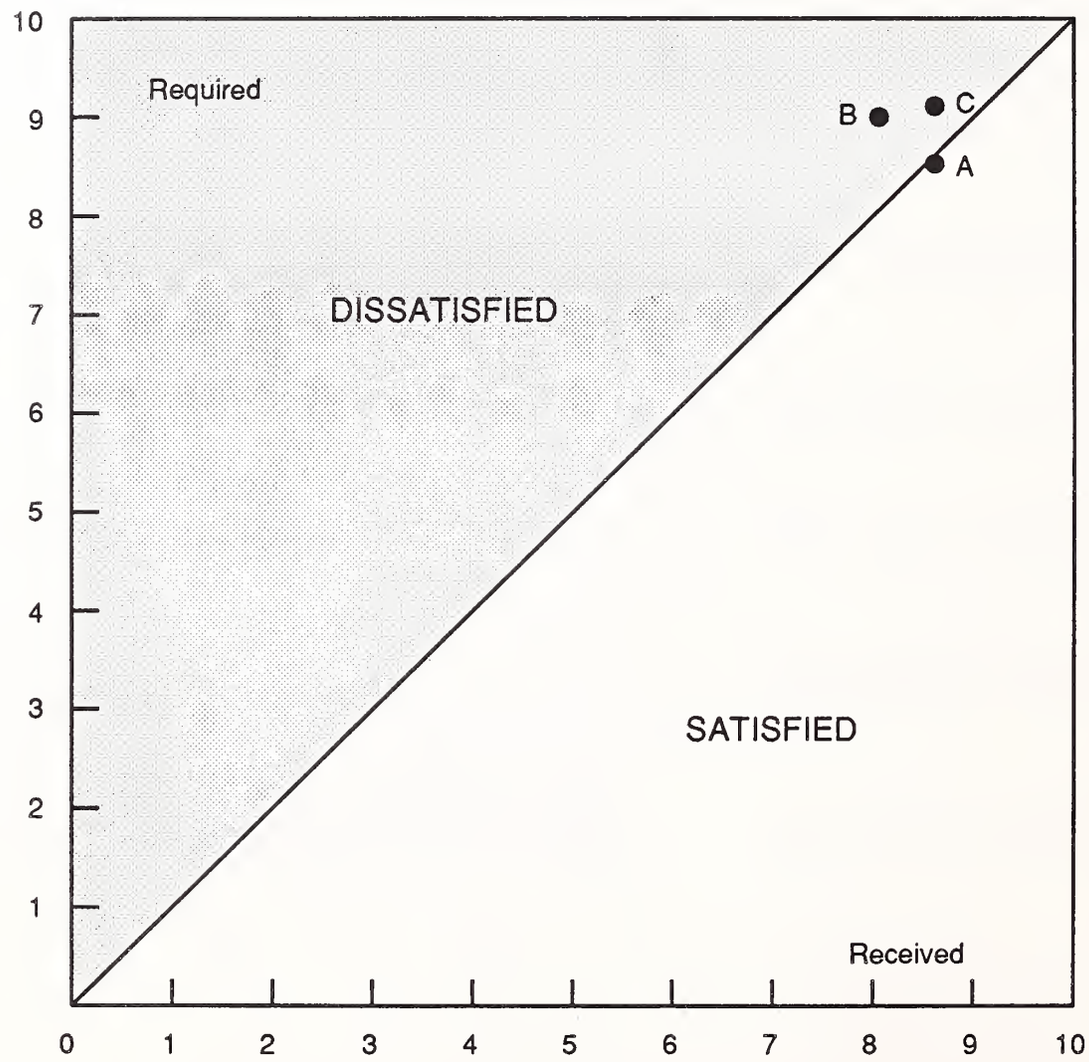


*Insufficient Response

Despite the fact that nearly half of micro users rated their FE's skill below required levels, three-quarters of the sample reported having received system support at levels meeting or exceeding their requirements, even in the face of rising demands. Third-party maintainers of micro units are standing up well to the rising requirements being placed upon them.

EXHIBIT V-18

USER SATISFACTION WITH TPM SUPPORT
MICRO SYSTEMS USERS



A = Parts Availability

B = Hardware Engineer Skill

C = Hardware Support Overall

Rating: 1 = Low, 10 = High Requirement/Performance

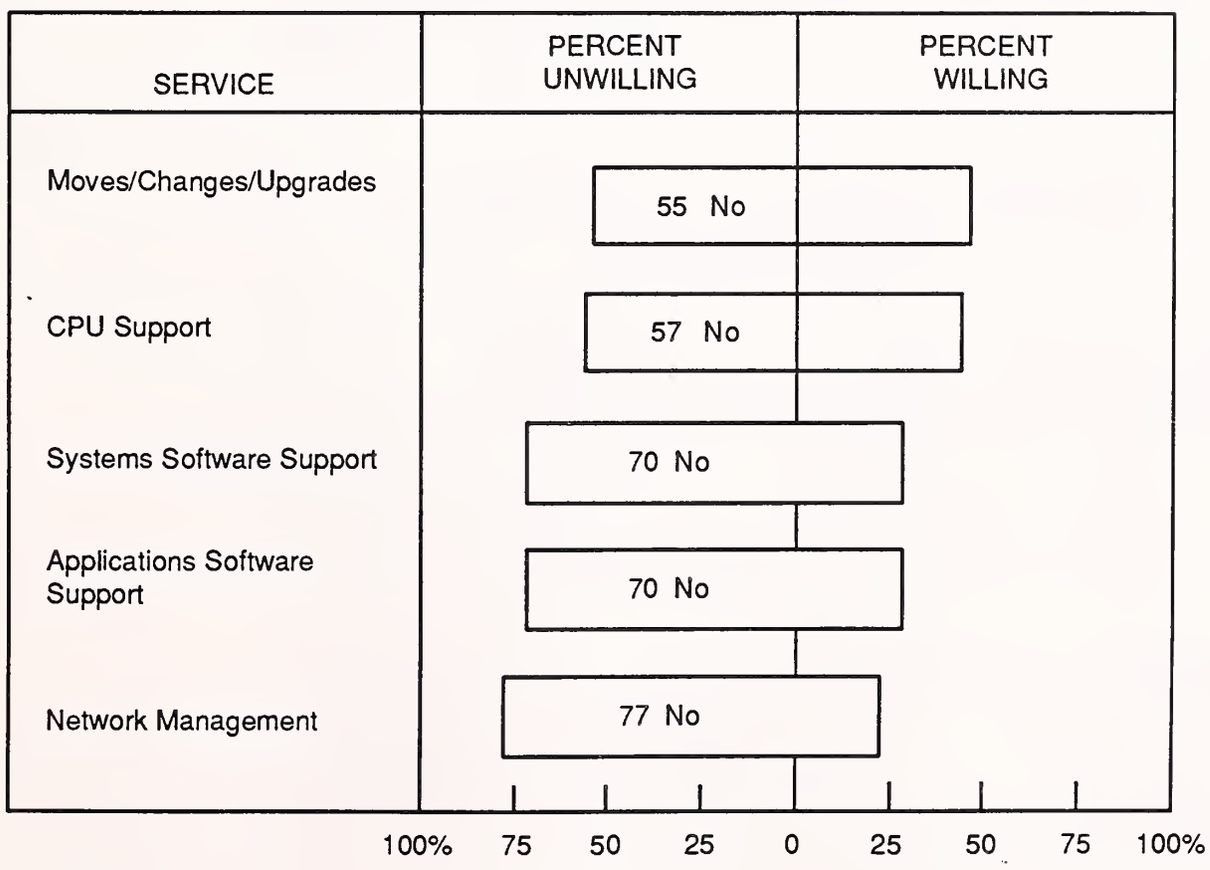
Exhibit V-18 graphically plots these needs against vendor performance, demonstrating the high levels of support PC users are requiring as well as the commendable job TPMs are doing in meeting demands. Hardware engineer skill remains the key problem area, as users call for additional and on-going training of FEs to keep up with the ever-changing PC product base.

3. Market for Extended TPM Services

Micro users' concentration on the traditional aspects of third-party service precludes much interest in extended support offered by their TPM (as shown in Exhibit V-19). A little less than half of users showed willingness to involve their TPM even in the most basic of move/change/upgrade services, the nature of most PC systems rendering external help with the system unnecessary. Very few (30%) of micro users showed interest in third-party software support, and even fewer required assistance in the form of network management.

EXHIBIT V-19

WILLINGNESS TO USE TPM FOR EXTENDED SERVICES
MICRO SYSTEMS USERS



The fact that 43% of the micro sample showed willingness to involve their current third-party vendor in the support of their larger CPU does hold some promise, however, for TPMs offering higher-end support. Confidence in TPM capabilities in their current areas of responsibility has encouraged some users (not already involving their TPM in support of other units) to extend usage of third-party support, supporting the trend toward more profitable "cross-product" combined support contracts.

D

Peripherals Support

Along with the maintenance of micro systems, peripherals service has been the traditional realm of third-party support. Mixed vendor peripherals capabilities once being a key advantage over manufacturer-supplied support, TPMs are now encountering increasing competition from the equipment vendor side as many manufacturers add the service of "foreign" compatible peripherals to their menu of offerings.

Some equipment vendors approach the market promoting their third-party operations (Honeywell and CDC for example); other prefer to avoid the "TPM" label, providing service to other manufacturers' products more quietly (as do DEC or Data General). After a long history of staunch resistance to such third-party activity, the entrance of IBM into this latter category indicated the full extent of market demand for mixed-vendor support.

With this key point of differentiation all but erased, third-party peripherals maintainers have had to turn to other aspects of service to prove their worth over manufacturer-support.

1. Response and Repair Performance

One aspect of third-party support which has been steadily showing improvement in the face of growing manufacturer competition is problem resolution time, as seen in Exhibit V-20. Down from a total turnaround time (response plus repair) of 20.2 hours in 1986, peripherals users are currently reporting average times totaling just over 15 hours, closely approximating manufacturer-supplied response and bettering repair statistics.

EXHIBIT V-20

TPM VERSUS MANUFACTURER PERFORMANCE*
PERIPHERALS USERS

SUPPORT COMPONENT	TPM	MANUFACTURER
Response Time (Hours)	8.9	8.8
Repair Time (Hours)	6.4	7.0
Overall Satisfaction with Support**	7.8	6.9
Price of Service**	8.2	6.4

*As Reported by Current TPM Users
**Rating: 1 = Low, 10 = High Satisfaction

Prompt problem resolution was at the forefront of peripherals users' minds, with respondents citing fast response and repair times as the aspect of support weighed most heavily at this time. Third-party maintainers have targeted this key service component well, reducing their problem resolution times significantly over the past few years.

Service pricing, another traditional point of differentiation between vendor and TPM support, remains a strong perceived advantage to TPM peripherals users. Rating manufacturer-based service pricing at a low 6.4, current users of TPM regard third-party discounting a strong advantage over equipment-vendor support.

A less tangible difference perceived between TPM and manufacturer service is that of satisfaction with the level support received for that price. TPM users reported a higher degree of satisfaction with the quality of peripheral service overall, rating third-party vendor support at 7.8 on average, as compared to manufacturer service at 6.9 points.

This confidence users are expressing in the support provided by their third-party vendor may represent a turnaround of what was once a perceived advantage to manufacturer support -- that of experience with equipment under contract. Previously considered an inherent incentive in the choice of a manafacturer-based support contract, manufacturers are now following the third-party lead into the support of other vendors' peripherals; users experienced with third-party support now may perceive their TPM vendor as holding a certain advantage over a manufacturer new to support of foreign peripherals.

2. Analysis of Specific Aspects of Support

As was the case with microcomputer support, service on peripherals tends to be concentrated in the traditional hardware maintenance areas as few peripheral products require software or remote services. With this clear target, most vendors of peripherals service are meeting user requirements well, as is illustrated in Exhibit V-21. Overall, third-party support vendors are providing hardware support at levels well approximating peripheral users demands, holding steady from 1986 ratings, at 7.8.

In the specific area of hardware engineer skill, however, user requirements have increased to the level of 8.6; many users express concern over the competence of the FEs they work with. Although TPMs have increased their performance in this area to meet the (7.9) requirement of our 1986 sample, user needs are escalating, and many respondents are calling for increased FE training and a lower incidence of personnel turnover among TPM staff.

Another area of common concern voiced by peripherals users was of communication between vendor and user staff, with a number of respondents stressing the importance of "personal" service and the level of "care" expressed in support. The support of peripherals, although generally less critical by definition, must not be neglected in the wake of the TPM trend

EXHIBIT V-21

TPM SERVICE PERFORMANCE REQUIRED VERSUS RECEIVED PERIPHERALS USERS

SERVICE COMPONENT	RATING*		+/(-)
	REQUIRED	RECEIVED	
Training	**	**	0
Parts Availability	7.5	8.5	1.0
Remote Support	**	**	**
Hardware Engineer Skill	8.6	7.9	(0.7)
Software Engineer Skill	**	**	0
Software Support Overall	**	**	0
Hardware Support Overall	7.8	7.9	0.1

*Rating: 1 = Low, 10 = High Requirement/Performance

**Insufficient Response

Standard Error of the Mean = 0.4

towards higher-end systems support. Still a considerable source of revenues and a fundamental aspect of third-party "mixed-shop" service, the quality of peripherals maintenance remains an important criterion in user purchase decisions.

The common link between the user and the third-party firm is the field engineer, the key to this aspect of support vendor-user communication. In this sense, the additional training required of FEs may well include customer relations skills, providing a personal supplement to technical expertise. Many service organizations are expanding the traditional

customer interface tasks of their FEs, modifying the titles and job descriptions of their support staff to reflect these changes. User demands are calling for the replacement of the reactive "field engineer" with the more proactive "customer service representative."

Despite ongoing battles in the industry between equipment manufacturers and TPMs over the right to freely procure parts for maintenance, the peripherals sector remains the least affected in the third-party market. Many small manufacturer organizations willingly turning over support responsibilities to qualified TPMs, hence a good portion of the peripherals market currently enjoys full cooperation from their serviced equipment vendors.

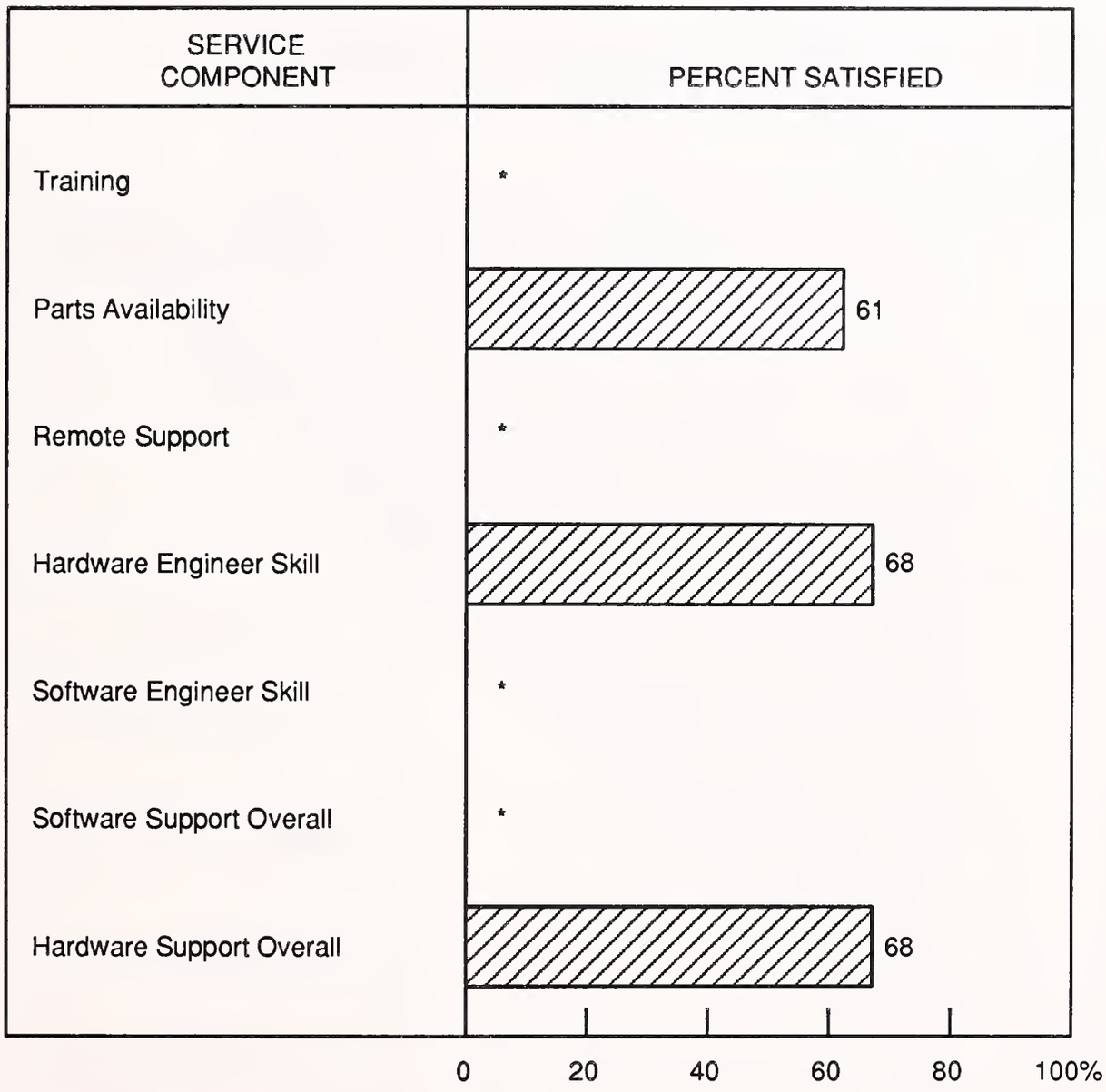
Reflecting in the high performance ratings earned by peripherals TPMs, Exhibit V-21 shows third-party parts support well exceeding user requirement levels on average. The concern of peripherals users over spare parts availability was far below any other product sectors, with relative need rated at a low 7.5. While parts support was a common comment among other product group samples when discussing pressing service concerns, very few peripherals users expressed anxiety over the availability of spares.

As increasing numbers of successful peripherals manufacturers grow, however, the acquisition of third-party support operations is becoming increasingly common, absorbing and dedicating the service function to the vendor's product line. Should this trend continue, remaining independent peripherals TPM vendors may find resistance increasing as manufacturers try to defend their service revenues.

Some resistance within the current market is reflected in the relatively low percentage of users satisfied with parts support despite the high mean ratings earned in Exhibit V-21 (support received surpassing average requirements by 1.0 points). Exhibit V-22 shows only 61% of peripherals users reporting vendor performance exceeding their required levels of parts support, indicating that, although many users rated TPM spares availability high, a good number expressed the need to improve parts support.

EXHIBIT V-22

USER SATISFACTION WITH TPM SUPPORT PERIPHERALS USERS

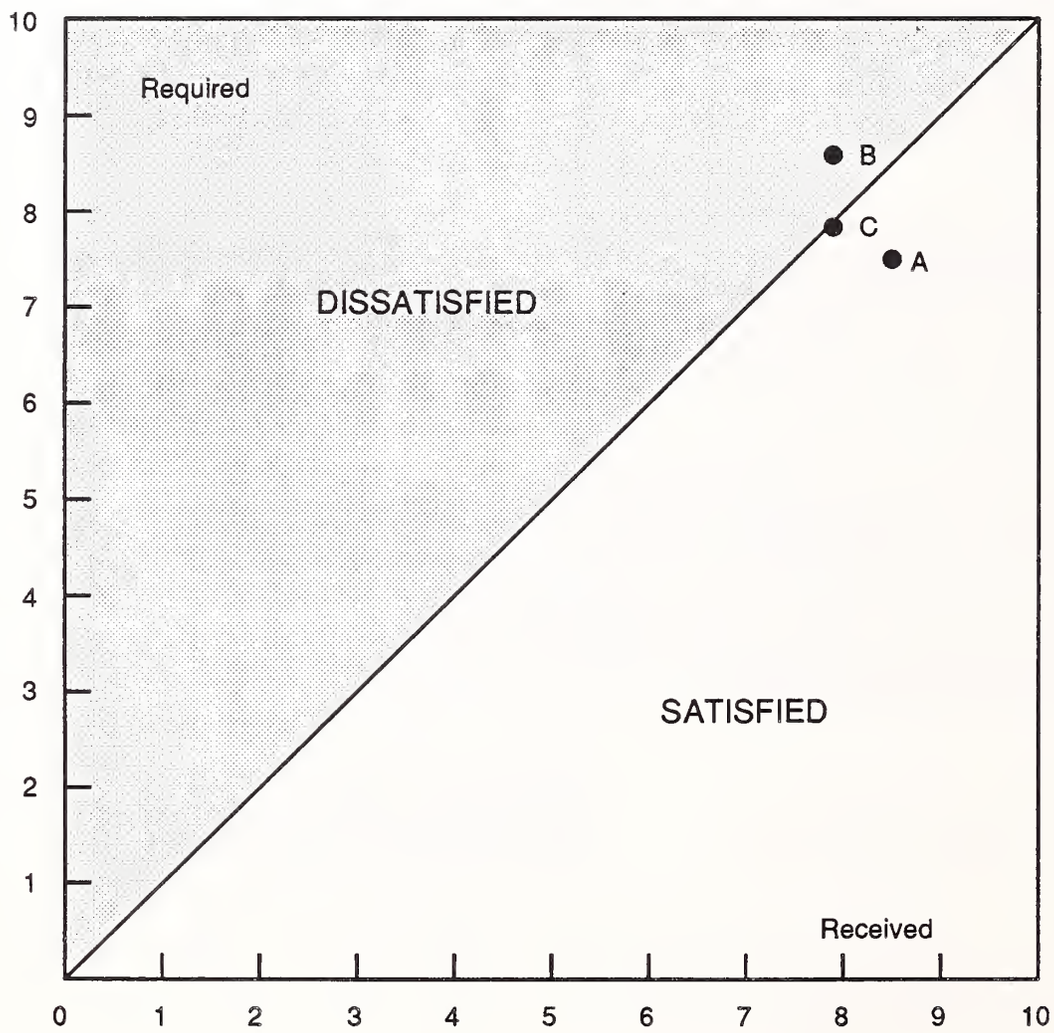


*Insufficient Response

Satisfaction with hardware services overall as well as engineer skill remained relatively high, 68% of peripherals users were satisfied with the current level of support they were receiving from their TPM. Clearly, as illustrated in Exhibit V-23, mean user satisfaction will be improved in these areas as vendor performance approaches the target area of user requirements.

EXHIBIT V-23

USER SATISFACTION WITH TPM SUPPORT
PERIPHERALS USERS



A = Parts Availability

B = Hardware Engineer Skill

C = Hardware Support Overall

Rating: 1 = Low, 10 = High Requirement/Performance

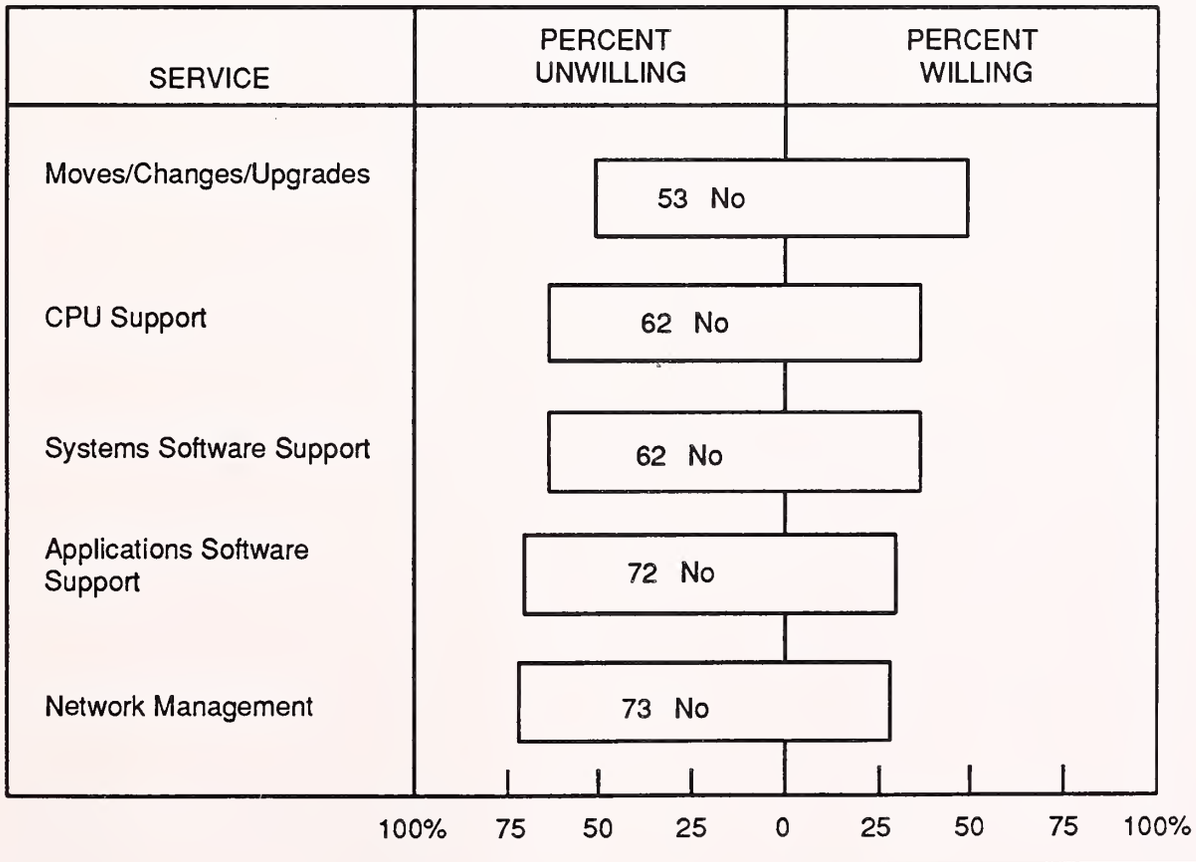
3. Market for Extended TPM Services

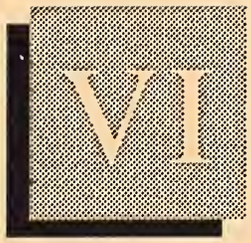
As shown in Exhibit V-24, the average peripherals user expressed little willingness to entrust extended support tasks to their third-party vendor. In the area of moves, changes, and upgrades, a little under half of the sample showed interest in receiving such services from their TPM, although for most peripherals products, the profitability of such activites for the TPM would be limited. Only in the higher-end of the peripherals spectrum (including such products as large system memory, disks, and tape drives) would expansion into these types of services be feasable.

Approximately 38% of current peripherals TPM users were willing to enlist their third-party servicer in the support of their larger system (CPU) units, and a corresponding amount of the sample showed interested in systems software service. For those peripherals TPM vendors offering this level of support, even this small percentage of interested users could represent a relatively profitable target, considering the greater revenue generation associated with such higher-end support.

EXHIBIT V-24

WILLINGNESS TO USE TPM FOR EXTENDED SERVICES
PERIPHERALS USERS





Directions in Third-Party Maintenance

VI

Directions in Third-Party Maintenance

As the third-party maintenance market matures, the initial, unrestrained growth once characterizing this market is now making way for a more stable business environment. The consolidation now being experienced within the market is creating a more powerful third-party competitive base as weaker players drop out of the running or are absorbed into stronger support organizations.

As a result, manufacturer-based service operations are applying more resistance against TPM encroachment, offering more competitive pricing and flexible contract options. Additionally, almost all major equipment vendors have now introduced their own brand of third-party support, providing a more direct competitive force against the further erosion of service revenues by TPMs.

Changes in the product side of the market are placing additional pressures on TPMs as hardware prices on the decline leave little margin for profitable maintenance. The increasing reliability of systems and peripherals has served to aggravate the situation as users experiencing fewer failures expect correspondingly lower maintenance costs on their units. Decreasing failure rates have also contributed to the feasability of the increased warranty offerings manufacturers are introducing, serving to further strain the competitive hold of third-party maintenance firms.

In the face of this heightened pressure on TPM's traditional competitive strongholds, third-party vendors are turning their focus more towards alternative services as their brand of discounted, mixed-vendor hardware support provides them with decreasing differentiation among service contenders. Under these competitive pressures a variety of new competitive fronts are opening to TPMs aware of unmet market demands.

A

Software Support Remains Strong Potential Market

As users continue their lament over the poor quality of their vendors' software support offerings, TPM's are provided with an open opportunity to strengthen their competitive stance in the market. A number of larger third-party vendors have officially introduced software support provision

to the market, and overall user acceptance is on the rise. Only approximately 25% of last year's sample utilized their TPM vendor for software support; nearly half of our 1987 sample reported some degree of third-party involvement in the maintenance of their systems or application SW packages.

Although an overall low percentage of users (not currently using third-party SW support) expressed a willingness to entrust SW service to their TPM (see Exhibit IV-6), interest was much higher among the large and small systems groups within the sample. These systems users represent the most promising segments of the market in terms of both penetration and profitability of TPM software support. Low interest among the lower-end (micro and peripheral) groups can be attributed more to the low SW support needs of these segments than an actual unwillingness to accept third-party support.

Particularly in the area of systems software, interest recorded within the large and small systems samples represents a significant opportunity to TPMs: Sixty percent of large systems users expressed a willingness to turn systems software support over to a third-party vendor, and a smaller, but significant amount of the small systems sample followed suit (see Exhibits V-7 and V-14).

The nature of manufacturer-supplied large systems support provides TPMs with a user base which already perceives software support as an integral part of overall maintenance, especially with many large systems vendors pricing and delivering SW and HW services under a single contract. As user acceptance of TPM as a legitimate and reliable source of support for their large systems increases, third-party vendors equipped to handle these users' critical needs are offered a unique opportunity for further market penetration through SW support.

The small systems market, although showing only 30% of non-users willing to utilize TPM systems software support, provides major market potential as TPM becomes more established in small systems service. The significant growth expected in the small systems product market has drawn many TPMs to extend their level of support to this segment of the market, and as users become more experienced with small systems third-party support, the ground will be broken in this sector for extended services such as SW support.

The low incidence of satisfaction with manufacturer-supplied support provides third-party vendors a ripe opportunity to strengthen their competitive hold within the systems market. The addition of software services to the TPM support menu can help to enhance user perceptions of third-party as a "total support offering." In addition, the low on-going costs associated with software support make the service one of the most potentially profitable among alternative offerings, and SW support can be expected to be the fastest growing among the up and coming extended third-party offerings.

B

Redefining the Maintenance Management Concept

In line with this shift away from traditional hardware services, third-party vendors have also begun to adopt additional extended services once available only through manufacturer service organizations. "Systems support" has come to mean more than typical remedial hardware maintenance provision; the market is demanding increasing, predictive support on a variety of levels.

A natural extention of the original (multi-vendor) "maintenance management" concept stressed by early TPM vendors, services such as site planning, training, systems and network consulting, and even leasing and credit services are being introduced by TPMs striving to redefine their differential advantage. As the profitability of traditional hardware support tightens, increasing numbers of service organizations -- manufacturer and third-party alike -- will be attracted to these alternative, and potentially profitable, services.

One aspect of extended support which holds particularly high potential is that of network management as the strategic advantage of systems integration continues to be marketed to the systems market. The need for a single source of management and coordination within a fully integrated environment allows third- party vendors an open opportunity to extend their multi-vendor experience into a growing market.

The push towards networked systems and integration is especially strong within the small systems market, with minicomputer manufacturers stiving to replace mainframe units with interconnected series of more flexible minicomputer systems. As increasing numbers of TPMs driven by the high growth expected in the small systems sector are expanding services to include small systems support, the strategic approach to this sector of the market should encompass the network management concept.

C

Focus on Vertical Market Strengths

Third-party market evolution having eliminated many weaker contenders and combined the forces of others, survival in the TPM market will require a much more focused approach than in the past. With the accelerating competition from manufacturer-support organizations and other TPMs alike, third-party vendors are being forced to define their strengths and limitations and work within them. The "smorgasbord" approach typical of early third-party organizations no longer provides the levels of expertise that users now demand of their service vendor.

The TPM market is begining to segregate into a number of vertical market segments as many TPMs recognize this need to concentrate their capital and energy to succeed in today's TPM environment. Allowing TPMs to develop existing resources within a chosen market niche, vertical market strategies can strengthen a vendor's competitive operations while allowing avoidance of already overcrowded market segments.

Two niche markets veiwed as especially promising are the banking and medical industries. With both requiring top uptime performance from their machines, medical and financial users provide a less price sensitive target market for TPM vendors willing and able to meet the high demands of these users.

Although the potential drawbacks of such specialization are obvious (including single-industry dependence, needs for specialized equipment, and limited customer base), the relative gains to be made in marketshare are great. Still a relatively unexploited approach to the third-party maintenance market, vertical-niche marketing holds great potential for vendors willing to model their business to fit a profitable sector of the market.

Appendix: Questionnaire

APPENDIX A:

CSP USER REQUIREMENTS QUESTIONNAIRE
THIRD-PARTY MAINTENANCE
1987

1. a. Manufacturer _____

   b. Model _____

   c. TPM Vendor _____

2. Please rate, on a scale of 1 to 10 (10 being highest), the following criteria for choosing your TPM vendor.

	Importance
a. Dissatisfaction with Manufacturer	_____
b. Only Service Available	_____
c. Price	_____
d. Quality of Service	_____
e. Proximity	_____
f. Mixed-Shop (multiple-vendor systems)	_____
g. Other (specify_____)	_____

3. Please compare the service received from your TPM vendor to that last received from the manufacturer.

	a. TPM	b. Manufacturer
1. Response Time (hours)	_____	_____
2. Repair Time (hours)	_____	_____
On a scale of 1 to 10 (10 being highest):		
3. Overall Satisfaction with Support	_____	_____
4. Price of Service	_____	_____

4. a. Please rate, on a scale of 1 to 10, your requirement for each of the following services.

   b. Please rate your current level of satisfaction with the services you receive from your TPM vendor.

	a. Require	b. Current
1. Training	_____	_____
2. Parts Availability	_____	_____
3. Remote Support	_____	_____
4. Hardware Engineer Skill Level	_____	_____
5. Software Engineer Skill Level	_____	_____
6. Software Support Overall	_____	_____
7. Hardware Support Overall	_____	_____

5. What services do you desire most from your third-party vendor?

   a. _____

   b. _____

   c. _____

6. Would you be willing to use a TPM company for the following support services? (Yes/No)

   a. Network Management _____

   b. CPU Support _____

   c. Systems Software Support _____

   d. Applications Software Support _____

   e. Moves/Changes/Upgrades _____

7. In what ways have you been approached by the manufacturer to return to their service?

   _____

   _____

   _____

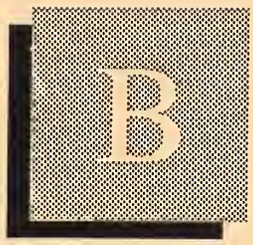
   _____

8. Have you perceived significant changes in service pricing over the past year?

9. Has your TPM had difficulty in acquiring and delivering spare parts?

10. What do you view as your most (three) pressing service concerns, and how could they be lessened or resolved?

Thank You!



Appendix: Definitions

APPENDIX B: DEFINITIONS

- APPLICATIONS SOFTWARE - Software that performs processing to service user functions.

- ARTIFICIAL INTELLIGENCE - The academic discipline involving the study of the processes by which humans perceive and assimilate data (and use reasoning to process this data) for the purpose of duplicating these processes within computer systems. Also, this term refers to the computer systems that accomplish these duplicated processes.

- BOC - Bell Operating Company.

- CONSULTING - Includes analysis of user requirements and the development of a specific action plan to meet user service and support needs.

- DISPATCHING - The process of allocating service resources to solve a support-related problem.

- DIVESTITURE - The action, stemming from antitrust lawsuits by the Department of Justice, which led to the breakup of AT&T and its previously owned local operating companies.

- DOCUMENTATION - All manuals, newsletters, and text designed to serve as reference material for the ongoing operation or repair of hardware or software.

- END USER - May buy a system from the hardware supplier(s) and do own programming, interfacing, and installation. Alternatively, may buy a turnkey system from a systems house or hardware integrator.

- EXPERT SYSTEMS APPLICATIONS - Applications for expert systems--a computer system based on a data base created by human authorities on a particular subject. The computer system supporting this data base contains software that permits inferences based on inquiries against the information contained in the data base. Expert systems is often used synonymously with "knowledge-based systems," although this latter term is considered to be broader and to include expert systems within its scope.

- ENGINEERING CHANGE NOTICE (ECN) - Product changes to improve the product after it has been released to production.

- ENGINEERING CHANGE ORDER (ECO) - The followup to ECNs which include parts and a bill of material to effect the change in hardware.

- ESCALATION - The process of increasing the level of support when and if the field engineer cannot correct a hardware or software problem within a prescribed amount of time, usually two to four hours for hardware.

- FIBER OPTICS - A transmission medium which uses lightwaves.

- FIELD ENGINEER (FE) - For the purpose of this study, field engineer, customer engineer, serviceperson, and maintenance person were used interchangeably and refer to the individual who responds to a user's service call to repair a device or system.

- FIELD SERVICE MANAGEMENT SYSTEM (FSMS) - A specialized application program that automates some (if not all) of the following activities of a field service organization: call handling, dispatching, parts inventory and tracking, billing, efficiency reporting, and other functions. Ideally, the system accesses one data base from which each function can use and modify data.

- HARDWARE INTEGRATOR - Develops system interface electronics and controllers for the CPU, sensors, peripherals, and all other ancillary hardware components. May also develop control system software in addition to installing the entire system at the end-user site.

- ISDN - Integrated Services Digital Network. A proposed standard for digital networks providing transport of voice, data, and image using a standard interface and twisted pair wiring.

- LADT - Local Area Data Transport. Data communications provided by the BOCs within local access transport areas (LATA).

- LARGE SYSTEM - Refers to traditional mainframes including at the low end IBM 4300-like machines and at the high end IBM 308X-like machines. Large systems have a maximum word length of 32 bits and a standard configuration price of $350,000 and higher.

- MEAN TIME BETWEEN FAILURES (MTBF) - The elapsed time between hardware failures on a device or a system.

- MEAN TIME TO REPAIR - The elapsed time from the arrival of the field engineer on the user's site until the device is repaired and returned to the user for his utilization.

- MEAN TIME TO RESPOND - The elapsed time between the user placement of a service call and the arrival at the user's location of a field engineeer.

- MICROCOMPUTER - A microprocessor-based single- or multi-user computer system typically priced less than $15,000. A typical configuration includes an 8- or 16-bit CPU, monitor, keyboard, two floppy disk drives, and all required cards and cables.

- MINICOMPUTER - See Small System.

- OPERATING SYSTEM SOFTWARE (SYSTEMS SOFTWARE) - Software that enables the computer system to perform basic functions. Systems software, for the purposes of this report, does not include utilities or program development tools.

- PBX - Private Branch Exchange. A customer premises telephone switch.

- PERIPHERALS - Includes all input, output, and storage devices, other than main memory, which are locally connected to the main processor and are not generally included in other categories, such as terminals.

- PLANNING - Includes the development of procedures, distribution, organization, and configuration of support services. For example, capacity planning, "installation" planning.

- PLUG-COMPATIBLE MAINFRAME (PCM) - Mainframe computers that are compatible with and can execute programs on an equivalent IBM mainframe. The two major PCM vendors at this time are Amdahl and National Advanced Systems.

- PROFESSIONAL SERVICES - A category services including system design, custom programming, consulting, education, and facilities management.

- RBOC - Regional Bell Operating Company. One of seven holding companies coordinating the activities of the BOCs.

- REMOTE DIAGNOSTICS - Gaining access to a computer from a point physically distant from the computer in order to perform problem determination activities.

- REMOTE SUPPORT IMPLEMENTATION - An extension of remote diagnostics where some level of support delivery is performed from a point physically distant from the computer. Currently, this capability is more common to

software support where problems can be solved or circumvented through downline loading of new code (fixes).

- RESELLER - A marketing organization which buys long-distance capacity for others at wholesale rates, selling services at retail but discounted prices and profiting on the difference.

- SMALL BUSINESS COMPUTER - For the purpose of this study, a system which is built around a Central Processing Unity (CPU), has the ability to utilize at least 20M bytes of disk capacity, provides multiple CRT work-stations, and offers business-oriented systems software support.

- SMALL SYSTEM - Refers to traditional minicomputer and superminicomputer systems ranging from a small multi-user, 16-bit system at the low end to sophisticated 32-bit machine at the high end.

- SOFTWARE-DEFINED NETWORK - A private network which uses public network facilities and which is configurable on an as-needed basis by the user (see Virtual Private Network).

- SOFTWARE ENGINEER (SE) - The individual who responds (either on-site or via remote support) to a user's service call to repair or patch operating systems and/or applications software.

- SOFTWARE PRODUCTS - Systems and applications packages which are sold to computer users by equipment manufacturers, independent vendors, and others. Also included are fees for work performed by the vendor to implement a package at the user's site.

- SUPERMINICOMPUTER - See Small System.

- SYSTEMS INTEGRATION - The action of a single service vendor's design, development, and implementation of a system or subsystem including integration of hardware, software, and communications facilities for a customer.

- SYSTEM INTERRUPTION - Any system downtime requiring an Initial Program Lod (IPL).

- SYSTEMS HOUSE - Integrates hardware and software into a total turnkey system to satisfy the data processing requirements of the end user. May also develop systems software products for license to end users.

- T-1 - Refers to a standard 1.544 megabit per second digital channel used between telephone company central offices and now used for microwave, satellite, fiber optics, or other bypass applications.

- THIRD-PARTY MAINTENANCE (TPM) - Any service provider other than the original equipment vendor.

- TRAINING - All audio, visual, and computer-based documentation, materials, and live instruction designed to educate users and support personnel in the ongoing operation or repair of hardware and software.

- TURNKEY SYSTEM - Composed of hardware and software integrated into a total system designed to completely fulfill the processing requirements of a single application.

- VSAT - Very Small Aperture Terminal. A small satellite dish system, usually using Ku-band frequencies.

- VIRTUAL PRIVATE NETWORK - A portion of a public network dedicated to a single user.